A HITCHCOCK PUBLICATION

GRINDING and FINISHING

SEPTEMBER · 1960

REFERENCE GUIDE TO ABRASIVE EQUIPMENT

at THE MACHINE TOOL EXPOSITION - 1960
PRODUCTION ENGINEERING SHOW
COLISEUM MACHINERY SHOW

IT WILL PAY YOU

TO MAKE THE MACKLIN FIELD ENGINEER A PART OF YOUR PRODUCTION TEAM!

Today, automated high speed grinding of new and improved metals . . . the exact dimensional tolerances and high finishes required . . . all call for quality wheels built for the requirements of the job.

That's why it pays to consult your MACKLIN representative. He offers a complete line of "Wheels of Profit" for industry . . . wheels designed to meet the exacting needs of modern production.

If you are wondering how MACKLIN can improve your grinding production, here's a suggestion. Contact your local Macklin distributor, or call us for the services of a field engineer. We'll be glad to prove in your own plant why it pays to use Macklin "Wheels of Profit" on all your grinding work.

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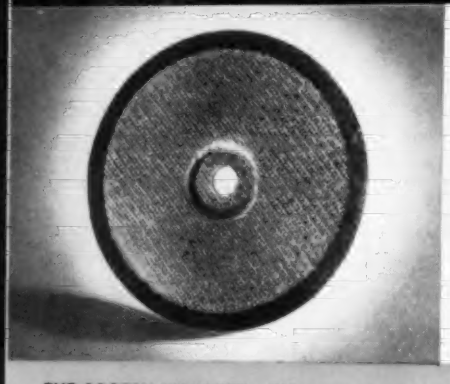
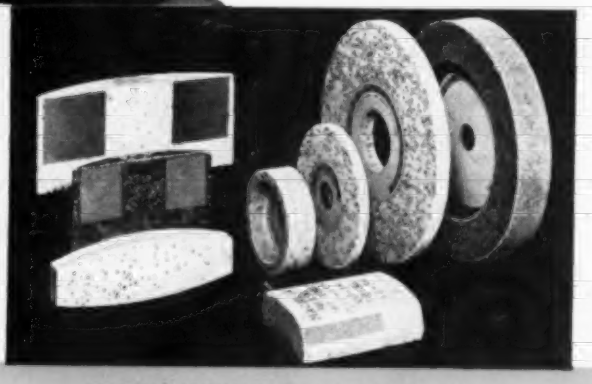
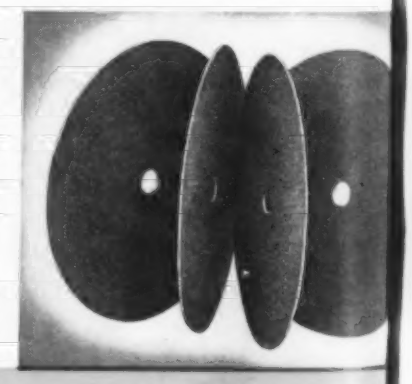


THE SCOTSMAN WHEEL—Gives superior performance on heavy weld grinding, notching castings, and smoothing flame-cut edges.



MACKLIN SEGMENTS (and tool room wheels). Segments fit any standard chuck. Give fast cutting with no checking . . . no burring.



MACKLIN CUT-OFF WHEELS Resinoid bonded for safe, cool, high-speed cutting.

GRINDING WHEELS

MACKLIN company

Manufacturers of a complete line of abrasive products

- Surface grinding wheels
- Foundry wheels
- Cylindrical grinding wheels
- Cylinder wheels
- Tool room wheels
- Disc wheels

Dept. E3, Jackson, Michigan
Phone: STate 4-6161

WHEREVER ABRASIVE OPERATIONS ARE PERFORMED

GRINDING and FINISHING

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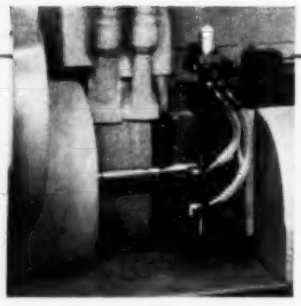
CINCINNATI 4″ Super

gives you ultra-high accuracy

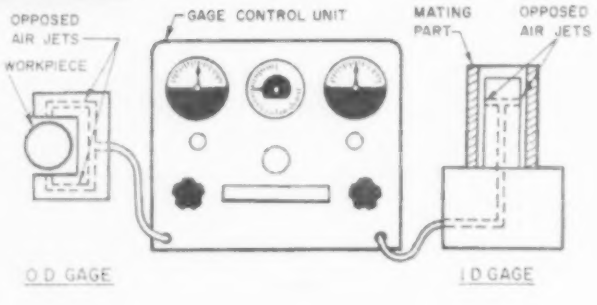
Here is a machine designed and constructed for just one purpose... ultra-precision grinding. The new CINCINNATI 4″ Super Precision Grinder produces size, roundness, straightness and surface finish *within a few millionths of an inch,* on a semi-automatic production basis. This extreme accuracy has many applications for matched-hole grinding of critical parts, such as missile control valves, fuel injector plungers, and a variety of other mating parts.

For maximum stability the new 4″ Super Precision Grinder incorporates heavy duty castings with extra ribbing. All alignments and center heights are held to tolerances approaching the vanishing point. Motors are super balanced, and both cutting fluid and hydraulic tanks are isolated from the machine to eliminate vibration. A special dual rate automatic infeed unit provides rates as low as .0002″ per minute. Cincinnati's Gage-Line unit assures extremely accurate taper adjustment, without trial and error or bothersome calculations; temperature and footstock tension adjustment are regulated with equal precision.

Cincinnati's exclusive Grind-A-Mate gaging system completely controls the automatic grinding cycle. Parts may be matched ground to preset clearances throughout prolonged production runs, regardless of diameter variations. Our Grinding specialists will be glad to provide further information regarding your particular application. Complete details may be obtained by writing for Catalog G-730.



CINCINNATI'S EXCLUSIVE GRIND-A-MATE GAGING SYSTEM *controls the entire automatic grinding cycle. Air jet gages continuously measure both the OD of workpiece as it is precisely ground (at left), and the ID of the mating part; and constantly indicate on a high amplification differential meter (below) the variation between the two diameters. Desired clearance between mating parts is preselected by operator on one dial.*



BUILDERS OF PRECISION GRINDING MACHINES: CENTERTYPE • CENTERLESS • MICRO-CENTER

THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO

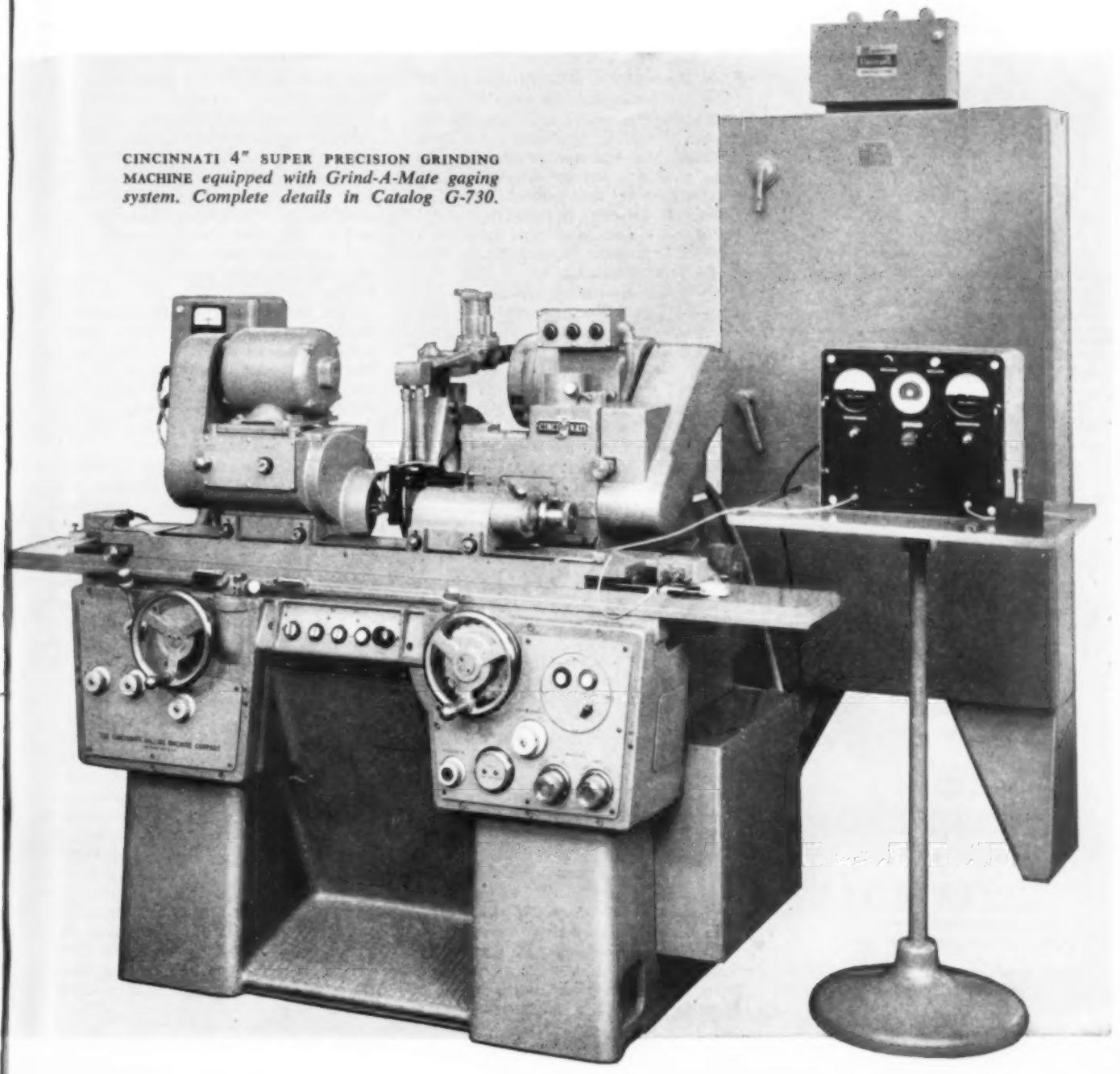
Precision Grinder

in matched grinding

CINCINNATI FILMATIC

MMT=PE MODERN MACHINE TOOLS PRODUCTION EFFICIENCY

Booth No. 1034



CINCINNATI 4" SUPER PRECISION GRINDING MACHINE *equipped with Grind-A-Mate gaging system. Complete details in Catalog G-730.*

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GRINDING MACHINE DIVISION

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DECISIONS
DECISIONS
DECISIONS

Make the correct decision on the choice of your Diamond grinding wheels:
Clear interpretation of the signals shown when on-the-job results are analyzed and translated into proper Diamond Grinding wheel **specifications** will result in the lowest cost in your Diamond wheel usage.

PRESSURELOK® IS BEST

PRESSURELOK® (the performance bond) by United States Diamond Wheel Co. makes the best of Diamond wheels because it scientifically combines warranteed amounts of graded Diamonds distributed in constant density throughout a perfect bond which wears uniformly at the ideal rate of Diamond usage.

be SURE . . . get

PRESSURELOK®

THE PERFORMANCE BOND

This wheel is a precise duplication of your specification, warranteed when properly operated, to give you the lowest cost per cut of any wheel.

Write for our catalog No. 957 or call us at Aurora TWinoaks 7-9181 for "Progressive Specifications" on your job without any obligation on your part.

US UNITED STATES DIAMOND WHEEL CO.

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Editor's Mail

Tool Geometry Grinding Solved

We are attempting to abstract technical articles involving machinability; especially tooling that might be used on single and multiple automatics. The purpose of this survey is to compile a bibliography on this subject. From the abstracted articles, the steering committee will determine the area most needed for further investigation in the field of metal cutting.

We would appreciate receiving a reprint of the following article so that we may include this in our study: "Tool Geometry Grinding Solved" March 1959; pp. 42-43.

O. D. Lascoe
Professor of Industrial Engineering
Purdue University

We are very happy to help any institution to provide increased investigation in the field of metal cutting. In addition we might add that the area of abrasive metal removal presently requires the most study.

Final Thought

Read your "Final Thought" in March edition and did you hit the nail on the head. From my own meager experience as a front line supervisor, your hi-points can be multiplied many times over with the people who work with me endeavoring to reach realistic goals. All too often we do not put ourselves into the other fellow's shoes and say to ourselves "How would you feel on the other end"—even concerning discipline. Congratulations on a well written article.

Mike Olasin
Shift Foreman
Cleveland Graphite Bronze Co.

It is always encouraging to know that our efforts have struck a responsive chord in our readers, and we are always delighted to hear from people who have taken the time and trouble to drop us a note. It is most encouraging, and very much appreciated.

Machine Tool Exposition

In the five years since the last Machine Tool Exposition, we have witnessed the most outstanding era of achievement in our industry's history. This is the result of the development and common usage of many new materials, which have made necessary more flexible machine design to fit a wider range of applications. However, the most significant reason for these advancements lies in the trend toward industry integrated design.

Machine tool manufacturers and customers have combined imagination and know-how to produce machines that meet specific requirements. The understanding of customer's problems, together with inter-industry cooperation and ingenuity, have provided machinery with far more versatility than ever before.

This understanding and cooperation has led to the adoption of many special machining and tooling techniques to standard model machines. It has also resulted in machines that stress consistency and stability of production, and assures closer tolerances, finer finishes and lower production costs.

In addition, machine tool equipment has been beefed-up. Weight has been added, where necessary, increasing stability, yet in most cases the over-all size of the unit has become smaller. This development counters rising costs of production work areas. The horsepower of drive motors has been increased, as has the quality of electrical components, bearings and castings, all of which makes the machine of today more flexible to meet a wider range of jobs.

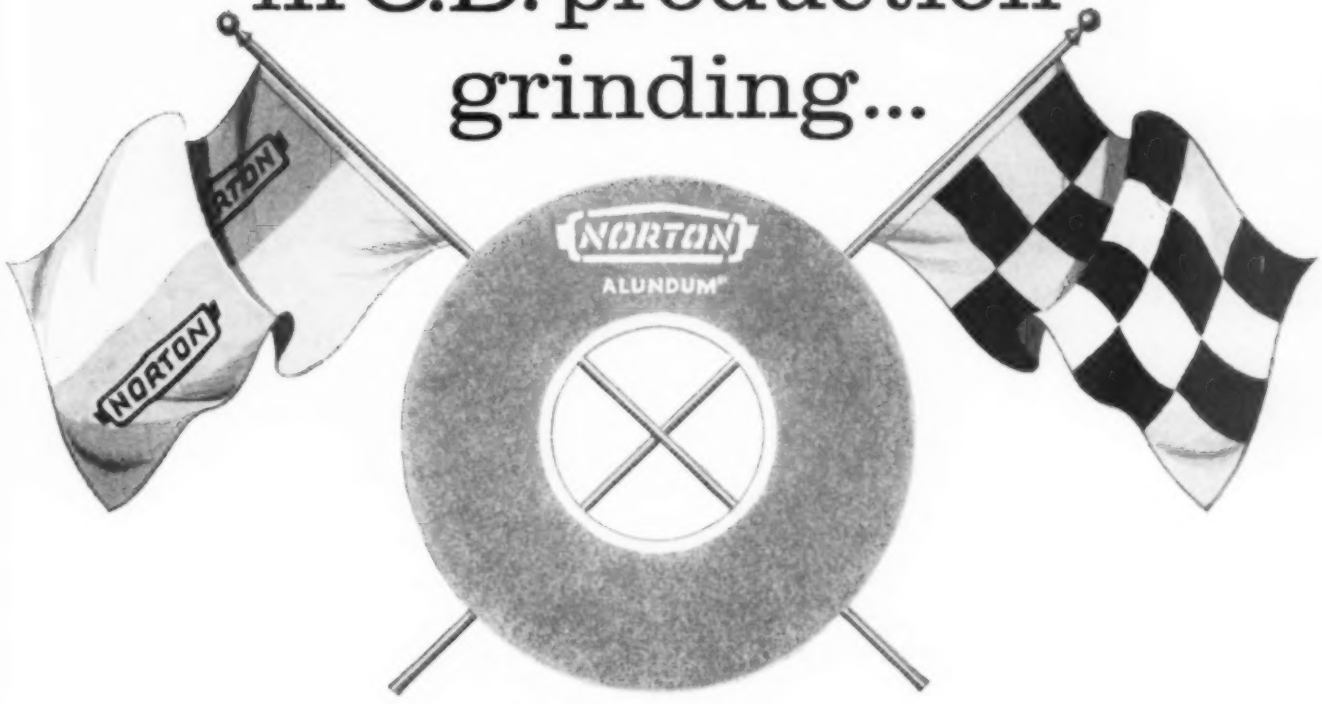
We have been asked to indicate a percentage of increased productivity, brought about by the new machine tool designs. Frankly, we cannot fairly establish this factor. Variables are always encountered when evaluating over-all efficiency, considering increased horsepower, accuracy and operating ease. In our advertising program, we stress "Cost Saving From Job Application". For instance, in a recent ad, we pictured a machine installation in a customer's plant that created a 1200% production increase by using a different approach to tooling and loading equipment.

There is little doubt that the advancements of the past five years have been the result of a combination of manufacturer-customer ingenuity, cooperation and know-how. More important, it has become further evident that, in the future, only through this type of industry cooperation can machine tools be designed to operate more efficiently at lower cost.

Paul W. Leming, President
Van Norman Machine Company

BIG NEWS

in O.D. production grinding...



You Can Now Get Norton Grinders With

HIGHER WHEEL SPEED

SEE THEM AT THE SHOW

Watch Norton Grinders Running at 8500 SFPM!

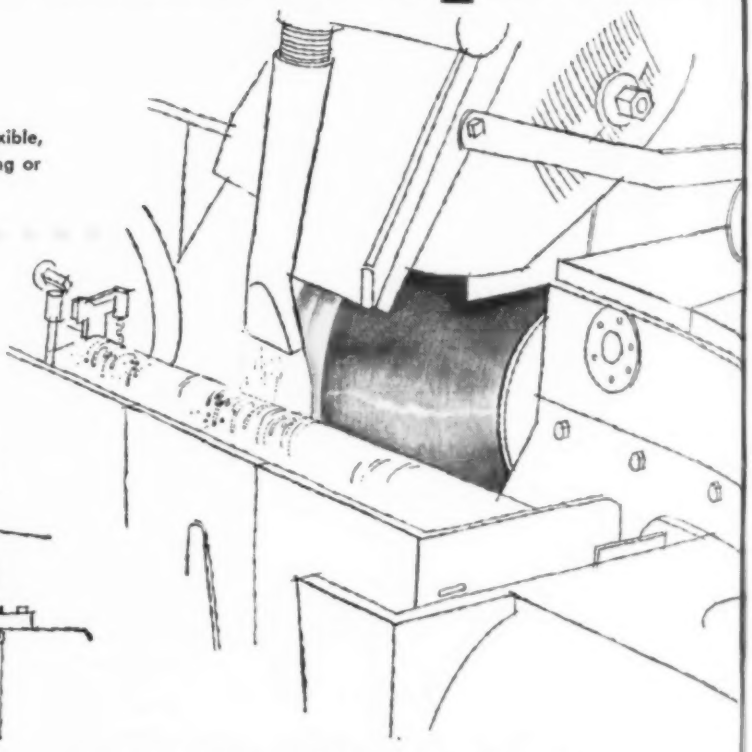
Learn how their greatly stepped-up speed brings you new production benefits...

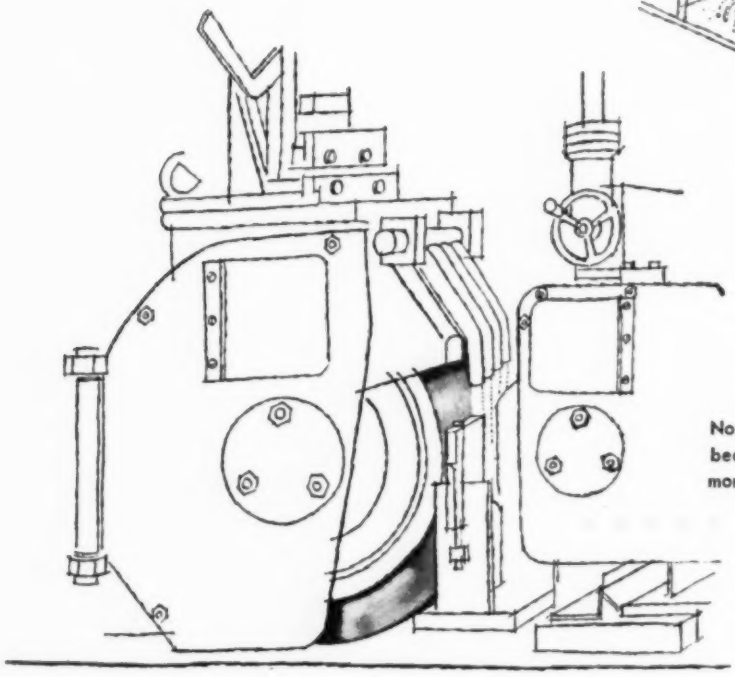
NORTON

Booth No. 651.
At the 1960 NMTBA Show

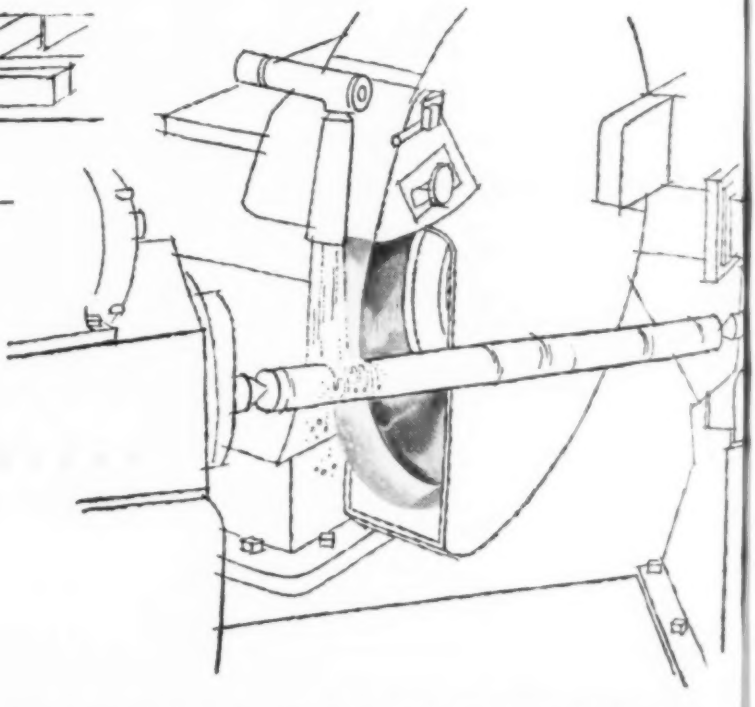
Higher Wheel Speeds

Norton Type CTU cylindrical grinders are fast, flexible, accurate. For single wheel or multi-wheels, roughing or finer finish, plunge or traverse type operations.





Norton No. 2 centerless grinder is outstanding for its straddle-bearing support of grinding and regulating wheels for faster, more consistent sizing.



Norton Type CP-1 PLUNGE-O-MATIC grinder designed solely for automatic plunge grinding, assures low unit cost production through fast, steadily paced action.

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

to Speed Production

Norton grinders with Norton grinding wheels at 8500 SFPM grind faster and better, with more savings than ever before.

Norton comes up with this latest advancement only after exhaustive testing of Norton machines and Norton wheels at the new higher speeds.

In test after test Norton machine-wheel teams proved their ability to grind at 8500 SFPM — *not only with safety, but with more advantages than were ever obtained under the previous limitation of 6500 SFPM.*

That's why important Norton cylindrical production grinders — Type CTU, plus the No. 2 Centerless, plus Type CP-1 PLUNGE-O-MATIC® — are now available with wheel speed ranges stepped up to 8500 SFPM.

New Norton High-Speed Production Benefits

Higher Productivity. Increasing SFPM by 30% reduces grinding time by about one-third and increases pieces-per-hour.

Finer Surface Finish. On most cylindrical jobs, the new higher wheel speed means a finer finish. On Norton machines this advantage is now available to you.

Longer Wheel Life. 8500 SFPM cuts down number of wheel dressings needed thereby increasing the production life of the wheel.

Lower Wheel Cost. Longer wheel life means more pieces-per-wheel, longer wheel use per dollar and thus lower operating cost per wheel.

From now on Norton grinders arranged for the new maximum of 8500 SFPM will be so identified by an attached plate. Norton grinding wheels of the types approved and specially tested for the higher operating speed will also be identified to show this approval. For details on how Norton wheels and machines can bring the new high speed advantages to your production — *fast!* — call your Norton Man, a trained Grinding Engineer. Or write to NORTON COMPANY, Machine Tool Division, Worcester 6, Mass. *District Offices:* Worcester, Hartford, Cleveland, Chicago, Detroit. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.

NORTON

75 years of . . .

Making better products... to make your products better

MACHINE TOOL DIVISION: Grinding and Lapping Machines — G & E DIVISION: Shapers • Gear Cutting Machines • Gear Induction Hardeners

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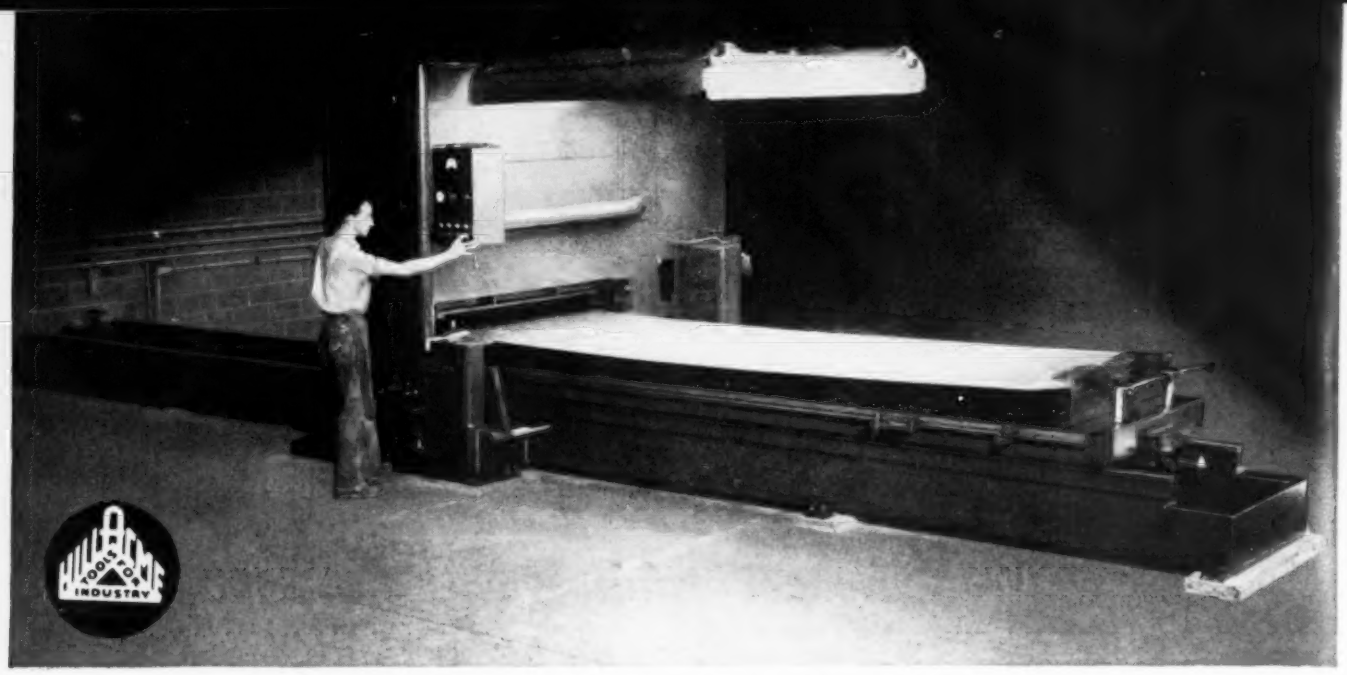
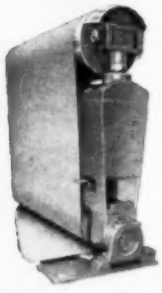
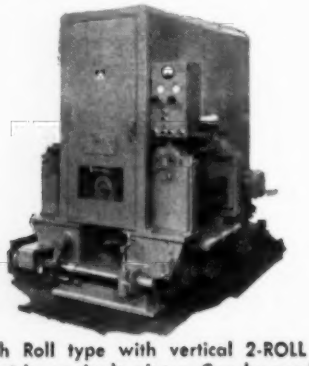


HILL Sheet and Plate polishing machine with reciprocating table and vertical 2-ROLL head.

With YOUR OWN HILL Abrasive Belt Grinding and Polishing Machine you can:



Vertical 2-ROLL HEAD. Two rolls, accurately controlled for speeds and pressures with easy adjustment for proper tension of the endless abrasive belt. A variety of grits are available.



HILL Pinch Roll type with vertical 2-ROLL head for polishing strip or single pieces. Can be used singly or in multiple units for line production.

1. Prepare the precise finish best suited to your needs.

2. Insure close inventory control of finished material.

3. Save up to half the cost of buying prepolished sheet and plate.

Increasing volume production points up the advantages of a HILL Grinding & Polishing machine in your own plant. No delay in deliveries – No premiums paid to outside sources for material that ALMOST meets requirements.

HILL 2-ROLL Vertical Abrasive Belt Grinding and Polishing machines are made in two general types for producing superior finishes on flat surfaces as required by manufacturers of decorative plastics, auto bumpers, engravers plates, home appliances, etc. Both types are built in polishing widths up to 60″. Larger sizes can be furnished.

THE HILL ACME COMPANY

1209 WEST 65th STREET • • • CLEVELAND 2, OHIO

"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • "ACME" FORGING • TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • ROTARY SHEARS • "CLEVELAND" KNIVES • SHEAR BLADES • MATERIAL HANDLING EQUIPMENT

We now manufacture, distribute and sell the entire line of KLING metal working tools.

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Editor's Page

SEPTEMBER, 1960

Look for Abrasive Operations

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Shows are the oldest form of selling known to man. From the Bible we can learn of markets which were the center of each town and to which farmer and merchant brought their products to sell. This month Chicago plays host to three such shows.

The shows, Machine Tool Exposition—1960, Production Engineering Show and Coliseum Machinery Show, present a rare opportunity for you to see abrasive-using equipment and accessories that can be extremely beneficial to you and your company. The shows will also be an occasion for you to meet and become acquainted with the top men in our industry. For five years there has not been, nor for five more years will there be, a time in which so much equipment and accumulated technical skill will be available to you and your associates.

You have often noticed articles and editorial mention of the benefits and superiority of abrasives within these pages. The shows will verify many of these comments. All of the various types of equipment will be on display and many will be in operation. You will have a chance to appraise each according to your needs.

Keep everyone of your metal removal problems in mind while you attend these shows. Compare each possible method with that of the abrasive operation. This will be a real test of the statements we have been making.

There is still another point to keep in mind while at these shows: Because there will be so much new equipment within easy reach, it will be important that every operation you perform be compared with the abrasive operations displayed. In many cases you will find you have problems you didn't know existed. New machines, new or improved methods will immediately reveal improvements which can be made on your present processing.

In this issue we have presented these show reports in a manner which will be beneficial to both those who attend and those who can not. To start with, there are maps of the various shows. Colors indicate those booths which will display grinding and finishing equipment. Following this is a brief description of each show in general; next, an index of the manufacturers who are exhibiting, with a listing of the equipment they are showing. Still another index follows with the products listed alphabetically and page numbers where they appear in this issue. This index is followed by descriptions of grinding and finishing equipment, grouped by type of equipment.

These shows will be extremely profitable. If we can be of further service, please stop in at our booth, No. 1506, in the Machine Tool Exposition.

M. M. Patterson

Managing Editor

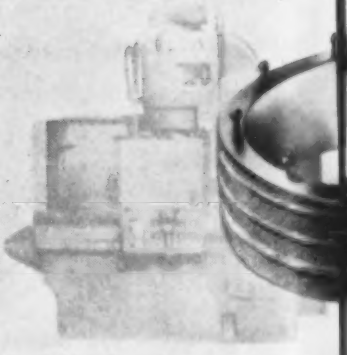
Precision-engine

MATCH T

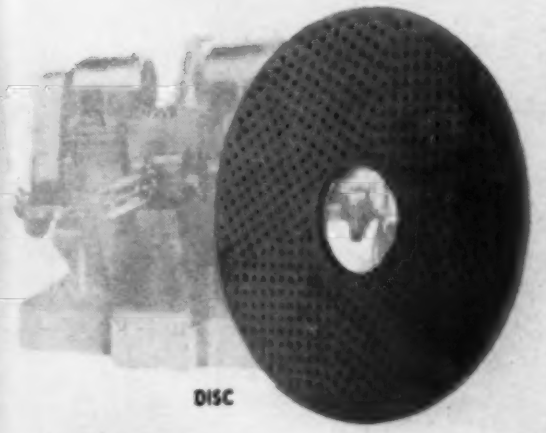
THE WORLD'S

CYLINDRICAL

INTERNAL

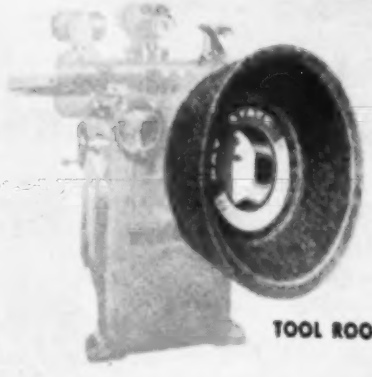


grinding wheels to
APABILITIES OF
EST MACHINE TOOLS



DISC

CENTERLESS



TOOL ROOM

BAY STATE
WHEELS of PROGRESS

Bay State salutes the tremendous technological achievements of the Machine Tool Industry and joins with the industry in offering to users of machine tools the finest grinding equipment in the world. Working in close association with many of the foremost tool manufacturers Bay State, too, has built an outstanding reputation for technological advancement. Through vigorous and carefully planned programs of product development and research into entirely new materials and techniques, Bay State today is able to offer industry wheels for every known type of grinding operation . . . wheels that assure *"better grinding at lower cost."*

BAY STATE ABRASIVES

Bay State Abrasive Products Co.,
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BAY STATE
WHEELS of PROGRESS

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Thor

Everything you want in 360 CYCLE Grinders...

and more!

25% faster metal removal. Compare it with *any* other type grinder.

30% saved on wheel cost. Constant speed gets maximum cutting power from the abrasives.

8% speed loss *under full load*—which saves you . . .

80% on power cost.

30% is the *minimum* overall saving.

100% best buy in High Frequency Electric Grinders!

Thor's straight or right angle models of 360 Cycle Grinders are available in 21 speeds, from 3700 to 21,600 R.P.M. Thor furnishes complete equipment for demonstrations in your plant. Call your Thor factory representative. Thor Power Tool Co., Aurora, Illinois. Branches in all principal cities.

Thor POWER TOOLS

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Abrasive Engineer's Corner

ARTHUR RAKESTRAW • Contributing Editor

Aluminum Oxide Blasting Grain Versus Sand, Steel Shot

• I would appreciate your sending me something about the advantages of aluminum oxide blasting grain over sand or steel shot for like jobs.— W. H. A., Richmond, Virginia.

Unfortunately we have not been able to accumulate information as to the comparative efficiency of all three materials on similar applications.

Steel shot, largely used in steel and cast iron foundries, performs the function of removing burned molding sand from the casting surfaces. It accomplishes this service by the impact of the steel particles, in a peening action which simply dislodges the unwanted skin of burned material, without removing any of the body metal of the casting.

Aluminum oxide blasting grain, silica sand, and other similar materials actually remove surface material. In the performance of this function, the impact of the grain particles against the blasted surface results in fracture of the blasting material.

On a recent test, results of which were made known to us, the inner diameter of brass cylinders were blasted to provide an improved bonding surface for a glass coating.

By volume, ten times more silica sand than aluminum oxide blasting grain was required to blast a given area. Frequent stoppages of blasting were necessary in order to dust the surface for inspection, when sand was used.

When blasting with aluminum oxide blasting grain, it was not necessary to interrupt blasting, as the absence of dust made visual inspection possible at all times.

Graphite-Impregnated Wheels?

• What are some of the advantages and uses of graphite-impregnated grinding wheels?—G. B., Caldwell, N.J.

The advantages of graphite as a filler impregnated into the pores or voids of a grinding wheel are debatable. Graphite is not an abrasive. In finely divided particles, it does act as a lubricant.

Quite some time ago, an open structure type abrasive wheel having the voids filled with graphite was introduced to the trade, and was said to possess many advantages in the grinding of tungsten carbide. The graphite, no doubt, proved a boon to the manufacturer, enabling him to design, press, and burn a healthy, strong vitrified product.

We are of the impression, however, that the graphitic pellets served no useful purpose in the grinding operation. As grinding proceeds, the graphite is released, passing into the coolant or into the exhaust system, without having added materially to the actual metal removal.

"How's the steak, sir?"

We presume, however, that graphite, like many other materials used in the treatment of grinding wheels, might assist in preventing loading and in some cases act as a means of reducing penetration of the grain, and thereby improve finish.

Testing Abrasive Belts for Grinding Stainless in Coils

• What procedure would you recommend for testing abrasive belts, 36" x 50" wide, grinding heavy gauge stainless steel in coil form on a two-head tandem grinder?

We gather that testing in coil form is considerably more difficult than grinding sheet bar, since marking a coil by changing belts in the middle of a coil is undesirable.—A. D., Brackenridge, Pennsylvania.

The problem of eliminating or reducing the color change, when belt changes become necessary in surfacing lengthy sheets, is not new. For all practical purposes, the difficulty has been corrected by introducing a greater number of polishing heads into the line, thereby permitting a more uniform grinding action regardless of the loss of efficiency of any single belt.

Surfacing the coil surface with a two-head tandem grinder will naturally produce some color change in the sheet when a new belt is introduced on one of the heads. However, in the method explained below, this change may be well within the permissible limits and may not be objectionable.

For convenience in explaining the method, let us designate the grinding heads as Nos. 1 and 2, starting from the entering side.

Mount a half-used belt on No. 2 head and a new test belt on No. 1, and proceed with the grinding, with both heads in contact with the sheet.

When there is an indication by test or visual inspection that the finish is approaching an unacceptable condition, grinding should be stopped.

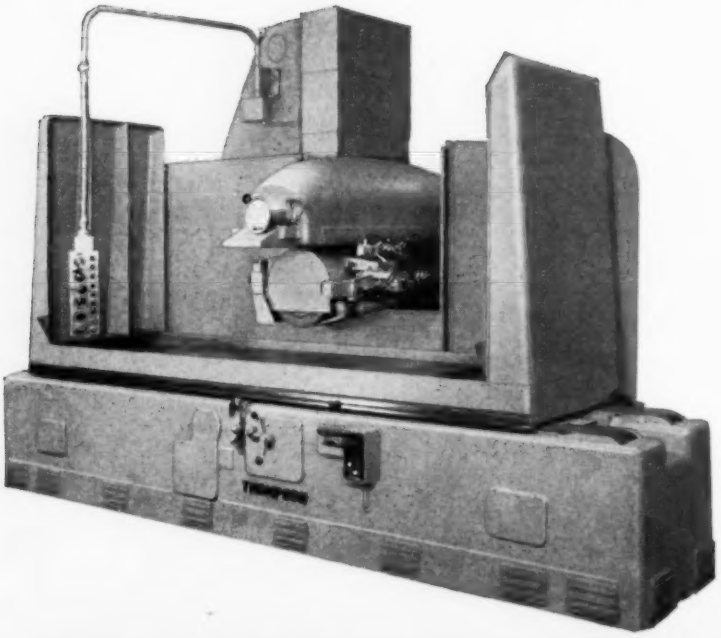
Remove the No. 2 belt; move No. 1 belt to No. 2 head; and mount another new belt on No. 1 head. The change should result in placing belts of approximately equal finishing characteristics in position to continue the existing finish.

Repeating this procedure should enable you to obtain as nearly a uniform finish as is possible with the tandem grinding heads.

Although in every change the No. 2 belt would be discarded at a point necessary to maintain uniform finish, there would possibly be considerable belt life remaining for short sheets or other miscellaneous uses.

For purposes of testing, the total belt life of particular belts when mounted on the No. 1 and the No. 2 head should enable you to arrive at a test comparison.

We hope that this suggestion will offer you some help in working out your problem.



THOMPSON
TYPE CX PLUNGE-MATIC GRINDER
36″ x 48″ x 72″

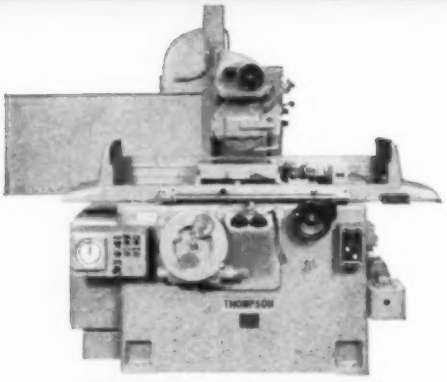
This grinder features Thompson's new and exclusive "CYBERMATIC PENDANT CONTROL" which completely eliminates the wheel head elevating hand wheel. All vertical movement of the wheel head, both automatic and manual, is accomplished effortlessly by dials on the pendant control.

6 MODERN Thompson

to increase your production

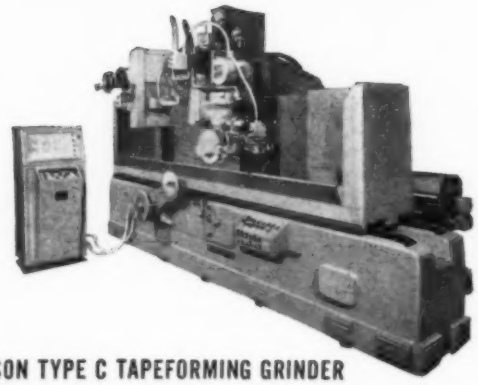
THOMPSON TYPE SUPER B GRINDER
12″ x 16″ x 36″

The outstanding feature of this Super B Thompson grinder is the 10 HP in-built wheel head motor on a spindle equipped with the world famous MALCUS BLOCK BEARINGS. These bearings are *pre-loaded—self-adjusting—cold running—rotationally stable—vibrationless and free from wear.* Other features are: Dial type cross feed with 14″ of stroke—Tape bed way covers —Thompson Hydra-Cool Hydraulic System with separate hydraulic sealed oil sump—Electro-Autosizing in-process gauging for solid or interrupted work surfaces with automatic spark out to move table to loading position with Autosizing gauge control.



THOMPSON TYPE 2F GRINDER
8″ x 12″ x 24″

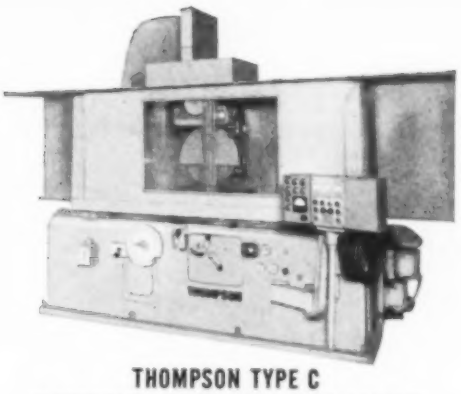
Equipped with a 3 HP 1800 RPM wheel head and a 12″x 1″x 4″ grinding wheel, special features on this machine include a table mounted double roll wheel crushing device consisting of 1 work roll and 1 master roll with timed dressing cycle for wheel crushing —9″ wheel head cross feed travel—5 to 90 FPM table speed using Thompson Hydra-Cool Hydraulic System.



THOMPSON TYPE C TAPEFORMING GRINDER
14″ x 28″ x 60″ with 10″ of vertical or horizontal form control

Numerical control consists of Thompson-Ramo-Wooldridge, Inc. Director System utilizing 8-channel punched tape with transistorized module-construction. This system provides numerical control to 3 axes of which 2 axes are selective. Wheel head spindle can be rotated in a horizontal plane for template grinding with a large diameter wheel.

This machine is designed for grinding sophisticated continuous path contours.



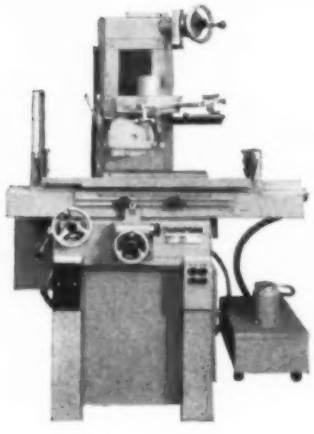
THOMPSON TYPE C
ELECTROLYTIC FORM AND FACE GRINDER
18″ x 28″ x 48″

This machine is equipped with a 3000 ampere ANOCUT electrolytic power unit using formed 16 pitch 90° serrations in an 18″ dia. non-diamond wheel. A stock removal rate as high as .250 cu. in. per minute can be accomplished on the super alloy tool steels with this new electrolytic grinder.

MACHINE TOOLS

efficiency

SEE THEM AT OUR BOOTH NO. 850
MACHINE TOOL EXPOSITION, 1960



THOMPSON TYPE D GRINDER
6″ x 14″ x 18″

This grinder features TRAVATROL power feed to the table without the use of table reverse dogs. Table stroke is controlled by dials set from a scale reading located on front of table. Table speed is infinitely variable from 12 to 35 feet per minute with manual feed also provided. Other features include: A head mounted Hoglund contour dresser manually operated from template with a 10 to 1 ratio covering a contour 1″ wide and ½″ deep.

THE THOMPSON GRINDER COMPANY • SPRINGFIELD, OHIO

"Keep Thompson in mind for that daily grind"

MMT PE

Thompson
SURFACE
GRINDERS

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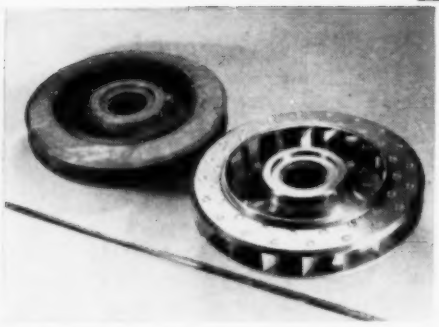
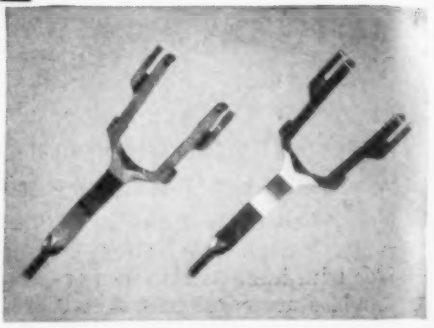
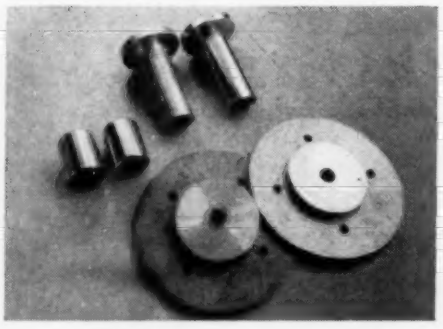
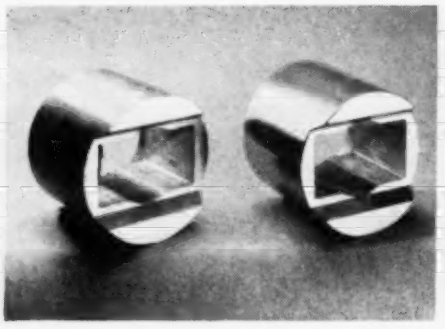
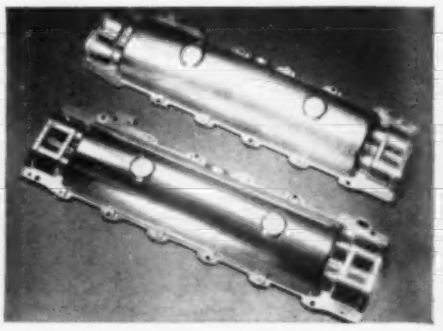
vibration



These photos prove it! Pangborn Vibratory Finishing gives the kind of finishing you never had before!

Pangborn Vibratory Finishing—culmination of years of experimentation and refinements*—is the newest method for cleaning, descaling, deburring, grinding, radiusing, fine-finishing, coloring and burnishing all metal and metal alloy parts, suitable plastic and ceramic items.

This unit gives you versatility of application, larger payloads and greatly-reduced time cycles resulting in tremendous savings. It easily handles parts too delicate or intricate to finish by other methods . . . shielded areas and interior surfaces . . . even coarser jobs faster and better.

In a wide range of sizes. Also auxiliary equipment, media and compounds for every need. Send parts with exact finish specifications, or finished specimen, for sample processing in our laboratory to: Mr. William E. Brandt, PANGBORN CORPORATION, 820 Pangborn Blvd., Hagerstown, Maryland.

- Actually works up to 100 times faster than conventional methods; does more work better at lower cost
- Does work impossible to do by barrel finishing or other means
- Most compact vibrator on the market
- Air cushion support and suspension for automatic leveling and amplitude control supplants spring suspension systems subject to fatigue
- Standard basic machines are equipped with mechanically variable speeds
- Floor vibration entirely eliminated, making possible (for the first time) second floor mounting

* Pat. No. 2,422,786; June 24, 1947

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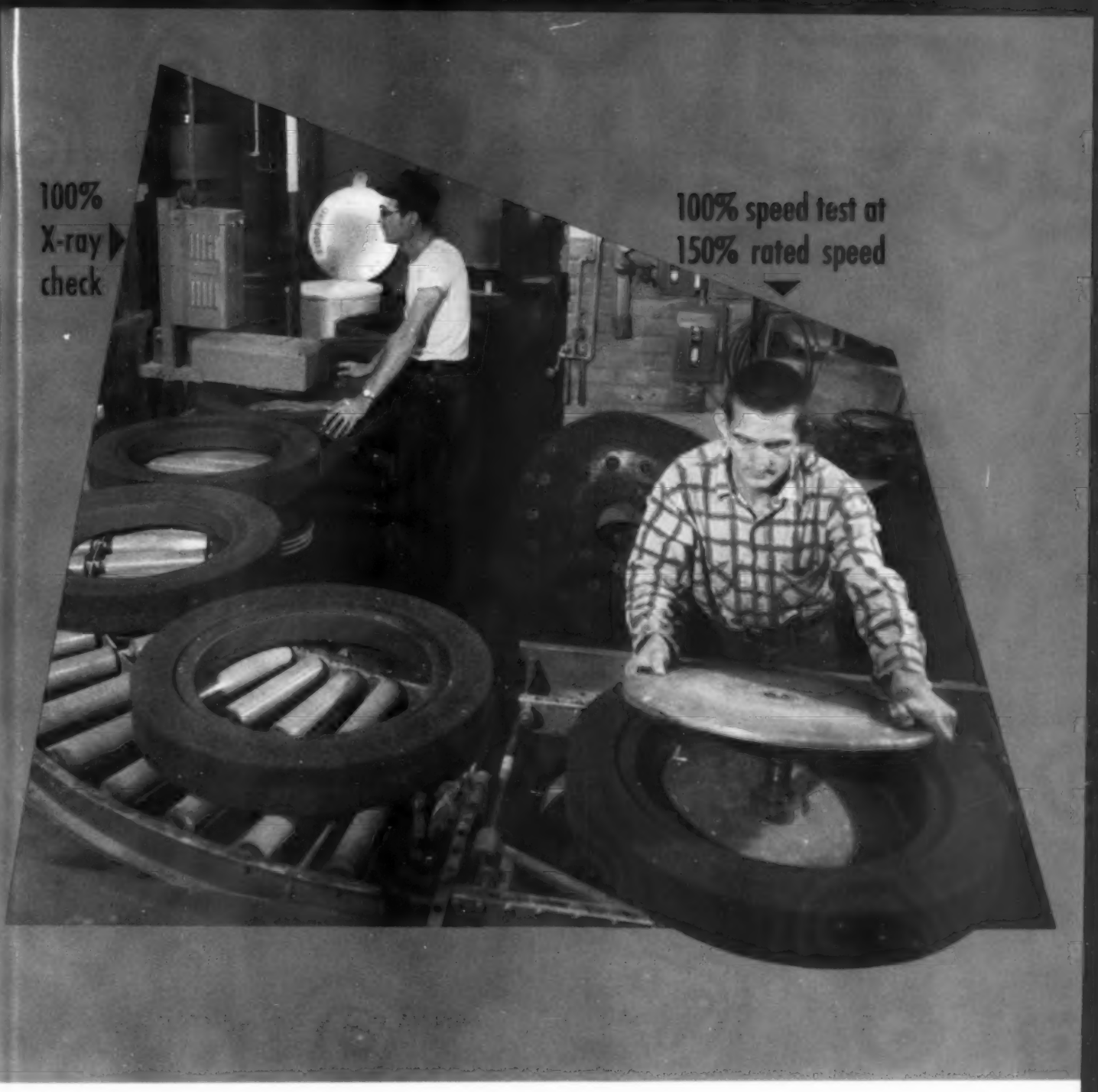

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Every Peninsular wheel must pass this test—must prove before delivery to you that it can safely take half again as high a speed as the maximum safe speed recommended.

It is one of a series of grueling tests developed by Peninsular to make sure that its wheels—vitrified or resinoid—are the safest and highest performance wheels you can find anywhere.

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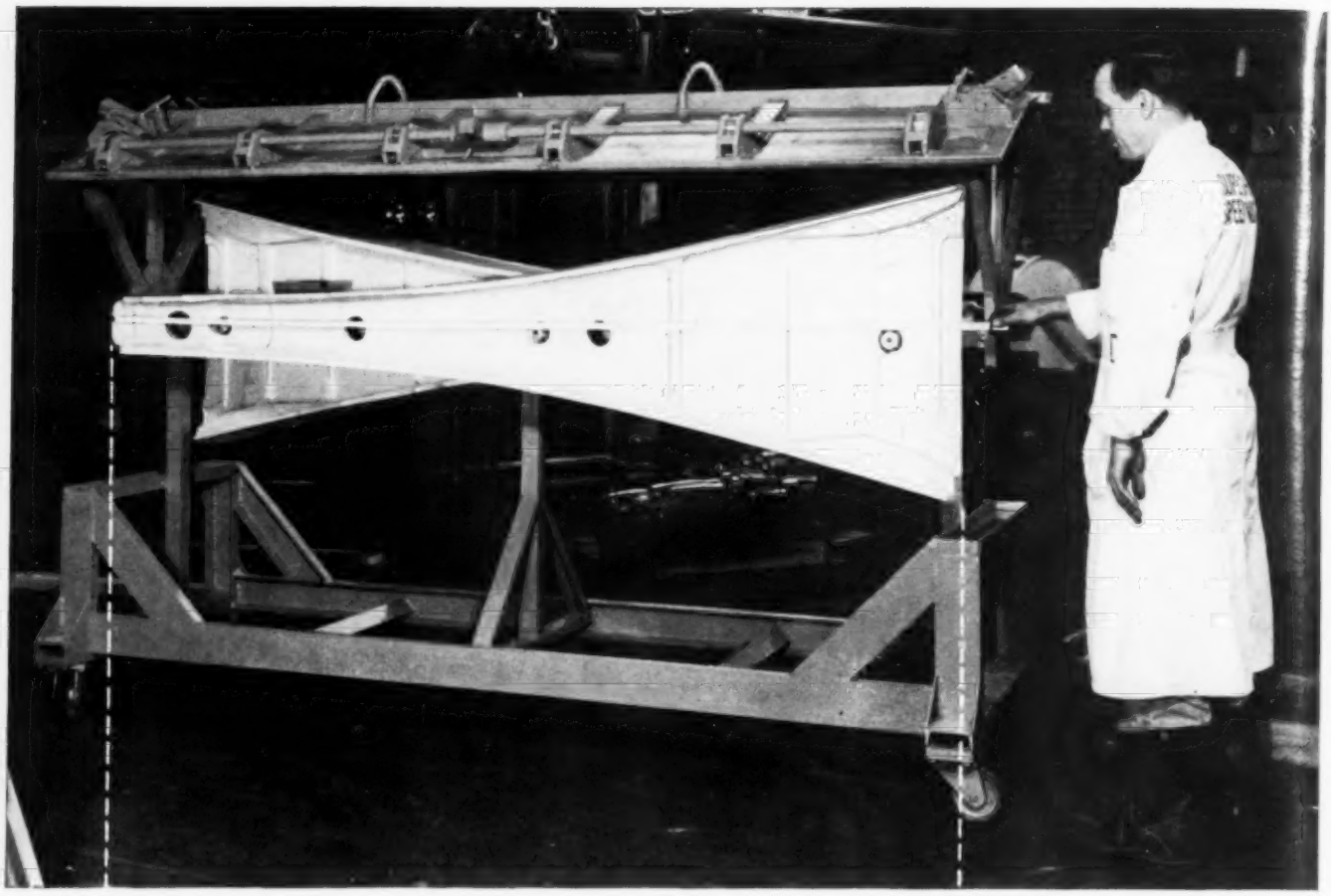


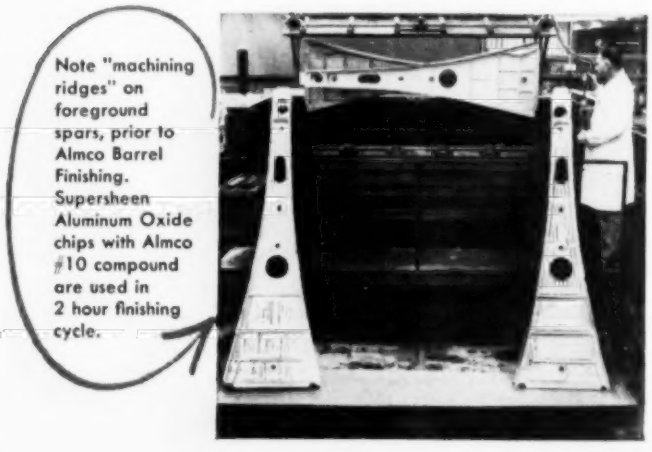
Can parts this long be barrel finished?

ALMCO Supersheen System
SUPERIOR MACHINES AND METHODS FOR FINER BARREL FINISHING.

YES! With ALMCO's efficient, versatile barrel finishing equipment, the 93 inch wing spar above was finished in a two hour time cycle. Thirty inches long at the wide end and 8 inches thick, the spars are finished two at a time in a special ALMCO unit at McDonnell Aircraft Corp., St. Louis, Missouri. Previous hand methods required many additional hours of finishing time and it was difficult to maintain uniformity of the parts.

These aircraft wing spars are barrel finished to blend in radii and improve micro-inch finish on other surfaces through use of ALMCO Supersheen media and burnishing compounds. All surfaces receive the same treatment—rejects due to imperfect finishing are eliminated. Tremendous labor savings are made by using ALMCO's modern barrel finishing methods.

ALMCO's modern machines and methods—the Supersheen System—may help you achieve vital costs savings too. At ALMCO you receive trained counsel for your finishing problems . . . *free* sample processing in ALMCO's modern labs . . . skilled guidance in selecting the proper standard or custom-designed ALMCO machines and methods. Write today on your letterhead asking for an ALMCO sales engineer to call. Or send parts direct to ALMCO's lab with specs required.



Note "machining ridges" on foreground spars, prior to Almco Barrel Finishing. Supersheen Aluminum Oxide chips with Almco #10 compound are used in 2 hour finishing cycle.

NEWS ABOUT ALMCO'S NEW PRODUCTS!

New brochures now ready on Almco spindle machine, Vibrasheen, other cost saving units. Price list on Almco compounds and media included. Send for your Almco Album of New Products today!

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NEW EVIDENCE

. . . . . marks superiority of standard V40 segments

Recent tests conducted on forged die steels proved standard V40 segments by Carborundum to be freer cutting and less costly to use than the nearest competitive type.

Details of these segment tests have been sent to all Carborundum salesmen and distributors for the benefit of other segment users.

Grinding B block die sets of uneven heights and with deep pits and heavy scale, the V40 segments outperformed competition by 35% based on overall operating costs. The V40 segments drew less power and ground cooler.

The rate of cut was 38% faster. Abrasive wear was 58% less. The V40 segments used in these tests were National Standards, available as 'shelf stock', by Carborundum.

Ask your Carborundum distributor about this *new evidence* on his next call.

This is a paid advertisement by The Carborundum Company, Niagara Falls, N. Y.

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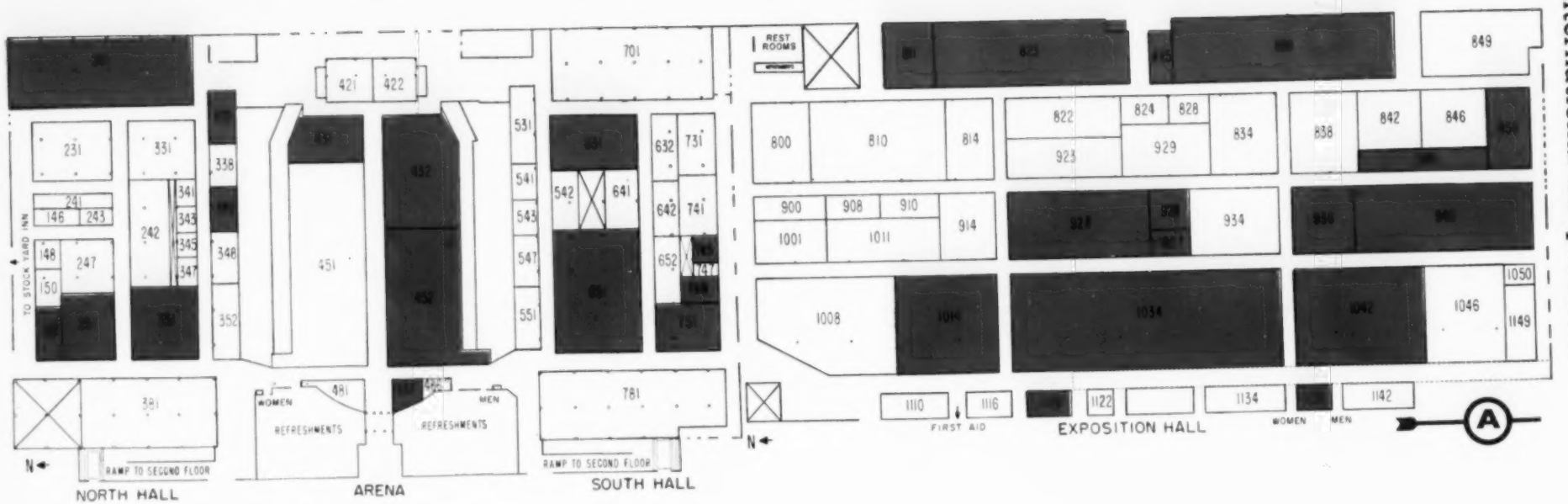
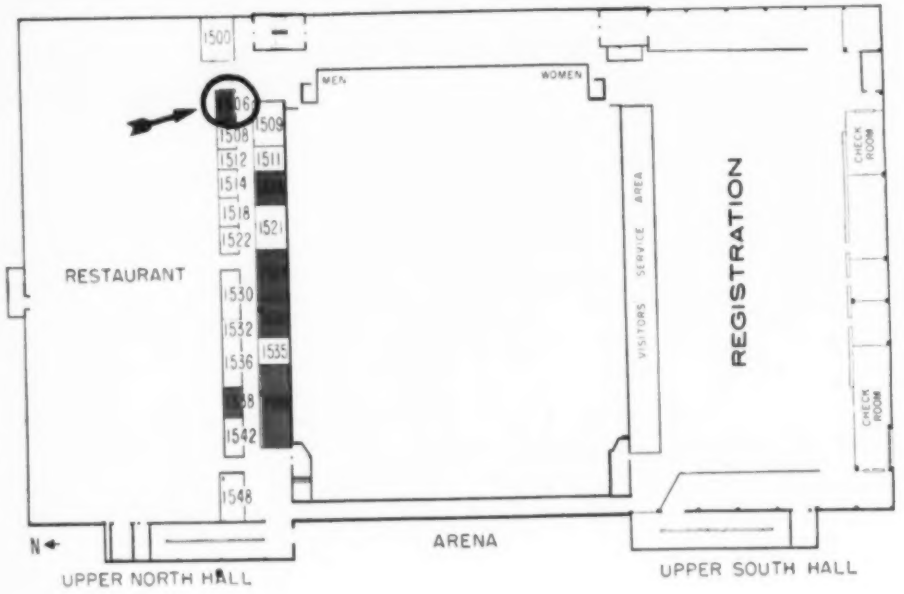
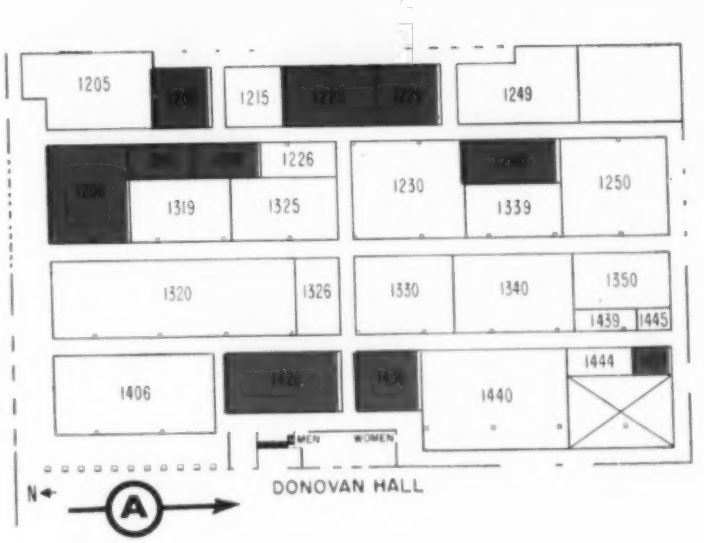
International Amphitheater







Chicago - 1960

The Machine Tool Exposition - 1960

Grinding and finishing equipment makes up a significant segment of the exhibits at this biggest of all tool shows. The important developments are completely covered below.

● The Machine Tool Exposition—1960 is the official title of the National Tool Builders' Association exposition which is held every five years. This show, which is the largest exposition held in the United States, will be at the International Amphitheatre, 43rd and Halsted Sts., Chicago, Illinois from September 6 through September 16. The hours will be 10 A.M. to 5:30 P.M. daily except Sunday.

Not since 1955 has virtually the whole machine tool industry displayed its products. In 1955, 103,000 production executives from all over the world attended the show. This year the exposition will be 25% larger and will be presenting equipment worth an estimated $25,000,000. Total area for exhibition and service will be more than 12 acres.

Admittance is by registration only. This can be done at arrival or by pre-registration cards. These cards, which can be obtained by writing National Machine Tool Builders' Association, 2139 Wisconsin Ave., N.W., Washington 7, D.C. or by contacting machine tool representatives, can be presented at the registration booths of either The Machine Tool Exposition or the Production Engineering Show with the fee of $3.00 and greatly reduce the time of registration. Each show honors registration of the other and no additional fee is required. General public and children will not be admitted. Telephone number for the show will be FRontier 6-6900.

Special non-stop buses will operate, during exposition hours, between principal loop hotels and the International Amphitheatre. Doormen at each hotel will inform you of the place of loading. Buses will be marked: "Machine Tool Exposition." Buses will also be available between the International Amphitheatre and Navy Pier (Production Engineering Show) and between the two Chicago Airports, Midway and O'Hare. By "L" or subway the International Amphitheatre can be reached by taking south bound State Street trains "A" or "B" to 43rd Street and Indiana Avenue, transferring to westbound bus "No. 43—Root and Halsted." Get transfer at time fare is paid, and validate it after leaving train but before boarding bus. Taxi takes approximately 20 minutes from the loop and cost is $2.00 for one person plus $.20 for each additional passenger.

By private car, go south on Michigan Avenue to 39th Street, west on 39th to Halsted Street, south on Halsted to Amphitheatre - or south on State Street to Archer Avenue, southwest on Archer to Emerald Avenue, south on Emerald to Root Street, west on Root to Halsted.

How To Use This Issue:

To the left is a map of the booths at the Machine Tool Exposition. On the next page is an index of those companies which will be displaying grinding and finishing equipment. All of this type of equipment which will be shown is listed under the name of the company and booth number. Those products we have singled out for discussion are listed in bold face type with the page number following. For additional convenience, we have included an index which lists the types of products written up along with the page numbers on which the write-ups may be found. • • •

Index of Grinding and Finishing Exhibitors

Participants showing grinding and finishing machines and equipment are listed with their booth numbers in alphabetical order below. Page cross-references in bold-face type are given for products described in detail elsewhere in this issue.

Barnes Drill Company 152
Rockford, Illinois
Honing machines, p. 30; Coolant filter, p. 24.

Besly-Welles Corporation 251
South Beloit, Illinois
Disc grinders, p. 26.

The Blanchard Machine Company 1209
Cambridge, Massachusetts
Surface grinders, p. 52; grinding wheels; grinding accessories.

Brown & Sharpe Mfg. Co. 452
Providence, Rhode Island
Surface grinders, p. 52; Slicing and dicing machine, p. 48; Cylindrical grinder, plain, p. 24; Grinding machine headstock, p. 28.

Bryant Chucking Grinder Company 936
Springfield, Vermont
Internal grinders, p. 38; Cam grinder.

Covel Manufacturing Co. 332
Benton Harbor, Michigan
Surface grinders, p. 54; Cylindrical grinders, p. 25; Optical comparator, p. 44.

DeVlieg Machine Company 431
(Jigmil Division)
Royal Oak, Michigan
Toolroom grinder, p. 62.

Eastern Machine Screw Corporation 745
New Haven, Connecticut
Abrasive belt grinder, p. 23; Toolroom grinder (chaser grinding equipment).

Ex-Cell-O Corporation 946
Detroit, Michigan
Tool grinders, p. 62; Cylindrical (groove) grinder, p. 25; Optical comparator, p. 44.

Frauenthal Division 1220
The Kaydon Engineering Corp.
Muskegon, Michigan
Contour grinders, p. 24.

Gallmeyer & Livingston Co. 751
Grand Rapids, Michigan
Surface grinders, p. 54; Tool and cutter grinder; Internal and external grinders.

Gardner Machine Company 811
Beloit, Wisconsin
Disc grinders, p. 26.

Gisholt Machine Company 1042
Madison, Wisconsin
Super finishing equipment, p. 48.

The Heald Machine Co. 924
Worcester, Massachusetts
Internal grinders, p. 38, 39; Tool grinder, p. 64; Universal grinders; Surface grinders.

The Hill Acme Company 1240
Cleveland, Ohio
Abrasive belt grinder (Sheet polishing machine), p. 23; Surface grinder, horizontal spindle, p. 54.

E. F. Houghton & Co. 1538
Philadelphia, Pennsylvania
Coolants.

Jones & Lamson Machine Company 839
Springfield, Vermont
Thread grinders, p. 61; Form grinders, p. 27; Optical comparators.

Landis Tool Company 823, 825
Waynesboro, Pennsylvania
Cylindrical grinders, p. 25; Surface grinders, p. 58; Chucking grinders, p. 23; Centerless grinders.

Leland-Gifford Company 631
Worcester, Masachusetts
Drill sharpening machines, p. 26.

Michigan Tool Company 945
Detroit, Michigan
Gear grinders, p. 27.

Micromatic Hone Corp. 747
Detroit, Michigan
Honing machines, p. 31.

National Broach & Machine Co. 1430
Detroit, Michigan
Gear tooth honing machine, p. 27.

Norton Company 651
Worcester, Massachusetts
Centerless grinder, p. 23; Cylindrical grinders, p. 25; Crankpin grinder, p. 24; Grinding equipment, p. 30; Lapping machines, p. 42; Surface grinders, pp. 58, 60; Tool and cutter grinder, p. 64.

Oliver Instrument Company 342
Adrian, Michigan
Drill sharpening machines, p. 26; Tool and cutter grinders, p. 66.

Parker-Majestic, Inc. 1136
Detroit, Michigan
Combination internal-external grinder; Internal grinders; Surface grinders; Universal grinders; External grinders.

Rivett Lathe & Grinder, Inc. 1210
Boston, Massachusetts
Internal grinders, p. 39.

The Sheffield Corporation 201
(Subsidiary of Bendix Aviation Corporation)
Dayton, Ohio
Form grinders, p. 27; Gages, p. 27; Roll grinder, p. 44; Thread grinder, p. 62; Gear grinders; Cylindrical grinders; Ultrasonic tools; Crush form dressers.

Size Control Company 1120
(Division of American Gage Machine Co.)
Chicago, Illinois
Lapping machine, centerless, p. 43.

The Standard Electrical Tool Co. 1450
Cincinnati, Ohio
Grinding spindles, p. 28; Machine tool accessories.

Sundstrand Machine Tool 1014
(Division of Sundstrand Corporation)
Belvidere, Illinois
Surface grinder, rotary, p. 60; Abrasive belt grinders.

Taft-Peirce Mfg. Co. 1426
Woonsocket, Rhode Island
Super finishing equipment, p. 49; Surface grinders, p. 60; Lapping Machines, p. 43.

The Thompson Grinder Co. 850
Springfield, Ohio
Surface grinders, p. 61; Contour grinder, p. 24.

Van Norman Machine Co. 351
(Division of Van Norman Industries, Inc.)
Springfield, Massachusetts
Internal grinder (ball bearing races), pp. 39-42; Cylindrical grinder, p. 26.

Index of Products

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Abrasive belt grinders	23
Centerless grinders	23
Chucking grinders	23
Contour grinders	24
Coolant filters	24
Crankpin grinders	24
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Product Descriptions

Further information on all of the products described below is available on request. If you are not attending the Exposition, or if you missed any item of interest, use the Reader Service Card, page 69, to get the additional data you want.

ABRASIVE BELT GRINDERS

Eastern Machine Screw Corporation 745

Eastern Machine Screw Corporation, having recently acquired the complete facilities and product line of Abrasive Machinery Company, will display and demonstrate for the first time the new Loungway Rise and Fall Abrasive Belt Grinder.

This grinder, according to the manufacturer, makes possible the grinding of flats, forms and contours in separate workpieces and in ganged parts.

The rise and fall feature of the belt grinder is obtained by use of a cam follower traveling over a cam attached to the work fixture.

The machine is manufactured in double-spindle and single-spindle models, the former being the more flexible. Double-spindle grinders are generally set up to provide two rough grinding passes and one finish grinding pass.

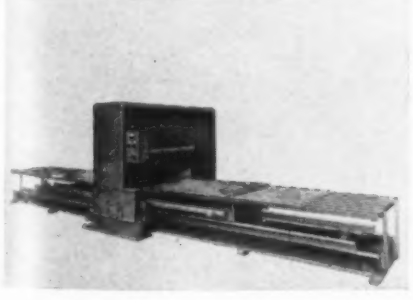
The Eastern Machine Screw Corporation, Truman & Barclay Sts., New Haven 6, Connecticut.

Use postpaid card. Circle No. 31

The Hill Acme Company 1240

The 48" x 12' long Hill sheet polishing machine will be shown under power, producing #4 finishes on stainless steel sheets. These will be finished ready for shipment to customers for the production of appliances.

The Hill sheet polisher, according to the manufacturer, will produce finishes



up to and including #8 in stainless steel.

This machine can be adapted for buffing, though none will be done during the Exposition.

The Hill Acme Company, 1201 West 65th Street, Cleveland 2, Ohio.

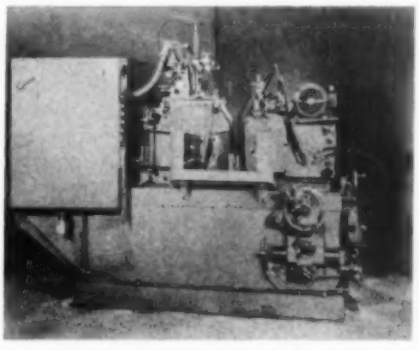
Use postpaid card. Circle No. 32

CENTERLESS GRINDERS

Norton Company 651

The Norton Exhibit will feature two No. 2 Straddle Bearing centerless grinders, first announced just a year ago. One will be set up for through-feed centerless grinding, and the other for semiautomatic plunge grinding.

In the through feed machine, rollers for antifriction bearings will be finish ground with work feeding from the back to the front of the machine. This particular arrangement (which can, of course, be reversed) leaves all the



controls on the front of the machine free and eliminates the need to move the loader for wheel changes.

Production of these parts will be over 3,000 pieces per hour, removing .001" of metal from the diameter.

The plunge feed operation will be done on a shaft with an irregular contour, pointing up the ability of the machine's truing device to climb a vertical shoulder as well as to dress straight, curved and tapered sections of the wheel. For this demonstration, the truing device will be equipped with automatic diamond downfeed, and adjustable controlled truing at preset intervals.

The Automatic Plunge feed arrangement will include a rapid stroke, automatic cushioning, adjustable rotating feed screw type grinding wheel feed, adjustable cycle time through a timer and automatic rapid wheel head retraction.

Norton Company, 1 New Bond Street, Worcester 6, Massachusetts.

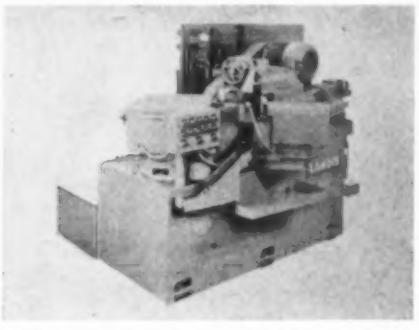
Use postpaid card. Circle No. 33

CHUCKING GRINDER

Landis Tool Company 823, 825

Simplified positioning of headstock and grinding wheel on the new Landis Type R chucking grinder, it is claimed, reduces setup time to a minimum for workpieces that can be most efficiently ground in a chuck.

Faces, outside diameters, radii and tapers can be ground singly or in combination on the Type R Chucking machine. Wheels can be spaced, if necessary, and dressing can be arranged to produce desired profiles.



The Type R feed provides a rapid feed, slow grinding feed, and sparkout. Rapid advance is adjustable from ¾" to 2". Slow grinding feed is adjustable for rate and amount up to .082" on work diameter.

The machine is equipped with a 24" grinding wheel driven by a 7½ hp motor. Wheels up to 4" wide can be used.

Landis Tool Company, East Sixth Street, Waynesboro, Pennsylvania.

Use postpaid card. Circle No. 34

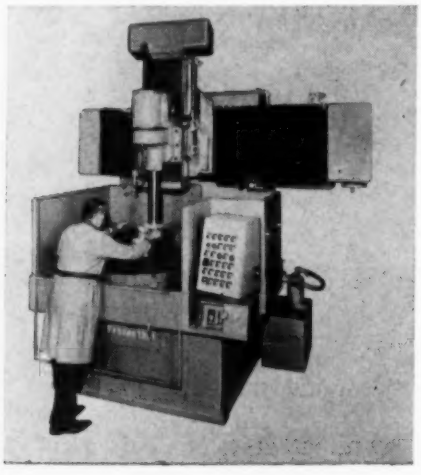
CONTOUR GRINDERS

Frauenthal Division 1220

Representative models of two different series of Frauenthal contour grinders will be on display. The 900 Series, custom machines designed to meet customer requirements, and the 1200 Series, (illustrated below,) single spindle grinders with 36" swing, will be shown.

Other Frauenthal machines are the 1800 Series, double-spindle machines with 60", 72", and 84" swing; the 2200 Series, similar, but with 72" to 175" swing and up; and the 3100 series, dual-purpose grinding and turning machines using a single set-up for both operations, with 60", 72", and 84" swing.

All machines feature vertical design, are available with guaranteed accuracy of —100 millionths of an inch, and include a complete range of accessory equipment.



These machines utilize vertical design to eliminate the deflection normally encountered when large unsupported parts are ground in a horizontal position. Vertical design also permits easier loading, faster checking of parts, reduced floor-to-floor time, and faster centering of parts such as large rings.

All machines are available with tracer, numerical, or manual control. "Building-block" construction permits adaptation of these machines for contour and conventional grinding along with similar machining operations.

Frauenthal Division, The Kaydon Engineering Corp., McCracken Street, Muskegon, Michigan.

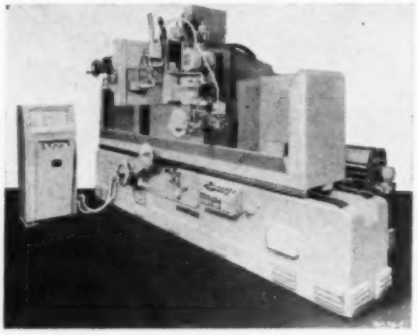
Use postpaid card. Circle No. 35

The Thompson Grinder Co. 850

This Thompson Type C Tape forming grinder (14" x 28" x 60") is designed for grinding sophisticated continuous path contours in both vertical and horizontal planes.

The numerical control consists of a Thompson-Ramo-Wooldridge, Inc. Director System utilizing 8-channel punched tape with a transistorized module-construction. This system provides numerical control to 3 axes of which 2 axes are selective.

The grinder is equipped with a 5 HP wheel head motor using a 14" x 2" x 5" grinding wheel. A U.S. VARI-DYNE Speed Control on the grinding wheel spindle motor automatically changes spindle speed from the dresser position to maintain a constant peripheral speed of the grinding wheel. The wheel head spindle can be rotated in a horizontal plane to permit template grinding with a large diameter wheel.



Other important features include a Hoglund head mounted hydraulic wheel truer with a pre-selected dressing cycle and automatic compensation as well as an automatic system of way lubrication to bed and table, saddle and column. Tape bed way covers are standard equipment.

The Thompson Grinder Company, 1534 Zischler Street, Springfield, Ohio.

Use postpaid card. Circle No. 36

COOLANT FILTER

Barnes Drill Company 152

For large flows of coolant including central systems, Barnes Drill Co. will introduce a new pressure type immersed drum filter. The new filters are designed with capacities ranging from 150 to 1000 GPM.

Automatically indexing fabric passes around a drum which is immersed in dirty coolant, and the coolant is pumped through the fabric to a clean coolant distributor tank. The full flow design assures a constant supply of coolant with maximum clarity. Included in the filtration exhibit will be standard models of magnetic coolant separators and Kleenall fabric filters.

Barnes Drill Co., 886 Chestnut Street, Rockford, Illinois.

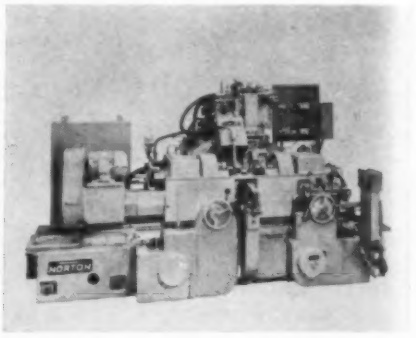
Use postpaid card. Circle No. 37

CRANKPIN GRINDING MACHINE

Norton Company 651

The Norton Type CC-8 Crank-O-Matic, being shown for the first time in any domestic exposition, will be arranged to grind the six crankpin diameters of an automative type crankshaft. It will be set up as part of a production line together with a Type CM-2 Multi-Wheel grinder and a No. 31 Crank-O-Lap lapping machine.

Several features insure consistent duplication of ground crankpin surfaces within close tolerances for roundness, diameter, shoulder width, and fillet radii. "STRADDLE BEARING" mounting of the grinding wheel spindle eliminates spindle deflection under load. A torque equalizing work drive rotates the two work heads with exactly equal torque preventing twist in the shaft that can cause out-of-tolerance grinding results.



Perhaps the most significant feature contributing to high quality in the finished work is the continuous path truing of wheel face and radii. The exceptionally accurate radius and blend produces stronger crankshafts. Results from machines already installed on production lines have proved the effectiveness of this truing device design.

A version of this machine is designed for fully automatic operation and is called the No. 2 Unitized Crank Pin Grinding Machine. For this application, the machine is arranged to grind a single pin on a fully automatic cycle.

Norton Company, 1 New Bond Street, Worcester 6, Massachusetts.

Use postpaid card. Circle No. 38

CYLINDRICAL GRINDERS

Brown & Sharpe Mfg. Co. 452

A newly designed No. 5 plain grinding machine with Ceda/Size equipment will also be demonstrated. This machine is furnished with a removable cartridge-type wheel spindle, of either plain or antifriction bearing design. The company offers a five year unconditional guarantee on the plain bearing spindle.

The headstock drive is through "O-Rings", resulting in extremely smooth operation. The wheel sleeve and guard

are furnished to accommodate a 16" wheel, from ½" to 2" wide.

The optional Ceda/Size equipment will permit a semi-skilled operator to plunge grind, on a production basis, to any predetermined size within ±0.000, 010".

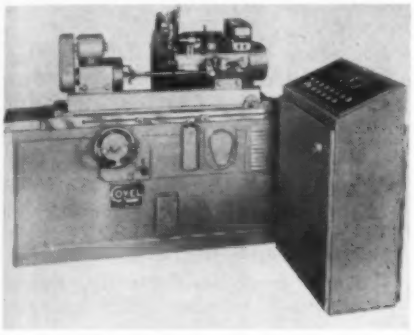
Brown & Sharpe Manufacturing Company, Promenade Street, Providence 1, Rhode Island.

Use postpaid card. Circle No. 39

Covel Manufacturing Co. 332

The Covel No. 42A is an electronically controlled automatic grinder for production cylindrical grinding, on centers, of a wide variety of parts to close tolerances.

Work is gaged in process through electronic controls that supply data to the feed motors. In many cases, final size is said to be attained automatically within tolerances of 0.000050".



Wheel wear has no effect on size, according to the manufacturer, and the gage is easily set up to make small lot production practicable.

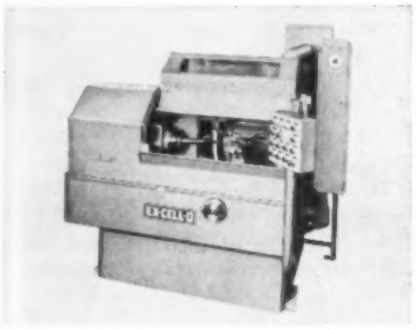
Covel Manufacturing Company, P. O. Box 116, Benton Harbor, Michigan.

Use postpaid card. Circle No. 40

Ex-Cell-O Corporation 946

A new precision groove grinder, Model 973, is designed for precision plunge grinding on parts of various sizes.

Featuring variable wheel feed, spark-out and withdrawal controlled by positive cam action, and hydraulically operated cross slide movements, the new



machine is fully automatic for grinding single or multiple grooves or forms.

Primarily a precision machine, the Model 973 is also said to be effective on roughing and semifinishing.

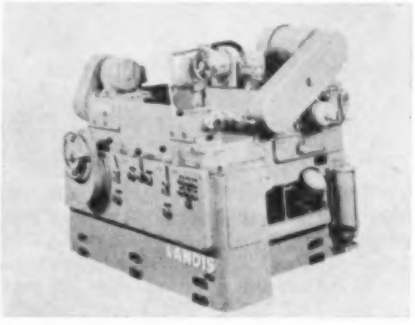
Ex-Cell-O Corporation, 1200 Oakman Blvd., Detroit 32, Michigan.

Use postpaid card. Circle No. 41

Landis Tool Company 823, 825

Fourteen new cylindrical grinders will be included in the Landis Tool Company display.

As an example, a new and completely redesigned 6" Type R plain grinder has as one of its major improvements a new hydraulic system with no open hydraulic drains in the bed. The hydraulic reservoir and motor have been taken out of the machine bed and located independently of the machine.



This eliminates inaccuracies caused by heat buildup in the reservoir, which affects machine alignment.

Other new or improved features noted by the manufacturer are a new wheel feed; a plain grinder footstock with a preloaded ball spindle for maximum stability; and a dresser with both slides on preloaded balls for exact profiling.

Landis Tool Company, East Sixth Street, Waynesboro, Pennsylvania.

Use postpaid card. Circle No. 42

Norton Company 651

Higher wheel speed (8,500 sfpm) for cylindrical grinding machines will be introduced and demonstrated at the Norton Company booth. This increase in grinding wheel speed from the previous maximum of 6,500 sfpm is reported to result in grinding time reductions up to 30% on a wide range of cylindrical grinding jobs, plus better finish and less frequent truing of the grinding wheel.

Wheels and machines for high speed operation are rigorously tested in accordance with the American Standard Safety Code for abrasive operations, and specially marked. Nonapproved wheels must never be used on high-speed machines.

Norton Company, 1 New Bond Street, Worcester 6, Massachusetts.

Use postpaid card. Circle No. 43

MultiWheel Grinding Machine

The Norton Type CM-2 Semiautomatic MultiWheel grinding machine is a completely new machine, replacing the former Type CM-1.

It includes, according to the manufacturer, many improvements for grinding crankshafts, camshafts, transmission shafts, and other shafts requiring multiple or exceptionally wide grinds.

Major improvements include:

Faster wheel changing because the motor does not have to be moved when grinding wheels are replaced.

Improved CTU type wheel feed mechanism.

Standard 42" diameter grinding wheels instead of the previous 36". With the stub size 28" instead of 22", there is 22% more usable abrasive, and the stub wheels can be used on smaller cylindrical machines. Hole size of 12" is designated especially for this purpose.

Truing devices located at the front of the machine.

Norton Company, 1 New Bond Street, Worcester 6, Massachusetts.

Use postpaid card. Circle No. 44

Plunge Grinding Machine

The Norton CP-1 Plunge-O-Matic plunge grinding machine represents a building block approach to high production automatic plunge grinding, designed from the beginning with the idea of incorporating a semistandard turret type automatic loader. In the past, machines for plunge grinding have been designed primarily for manual loading. Limited clearances in front of the grinding wheel, especially restricted swing, complicated the designs of automatic loaders. These complications led to completely special loaders and high selling prices.

With the 15 h.p. Type CP-1 it is possible to change over to other plunge grinding work with less expense than previously possible. Because of the building block design, it is possible to:

1. Use the same loader, with modifications, for a wide variety of parts.
2. Reposition the wheel slide on the rear base for angular or straight work.
3. Reposition the pedestals on the front base to accept any length part up to 30".
4. Reposition the front base in relation to the rear base for grinding near the head or foot stock.

The bases of the machine serve simply as supporting members and contain no mechanism. Every mechanism, as well as all piping, is readily accessible. The new feed is reported as a refinement on the Norton Type CTU wheel feed, with several new features.

Built into the feed system is a wheel wear compensator, which automatically adjusts for reduction in grinding wheel diameter after each truing cycle.

The speed of the wheel face is maintained at a constant rate even as the diameter is reduced. The variable speed wheel drive motor is controlled automatically by the action of the diamond carrying ram of the truing device. As the diamond advances to true the wheel a rheostat is automatically actuated to increase the wheel spindle r.p.m.

The speed at which the truing diamond traverses to dress an angled wheel is the same on each side of the wheel and the same in both directions. The angle of the "vertical" slide can

be adjusted to suit the conditions of the job. The constant speed of the diamond improves the finish obtainable on the work.

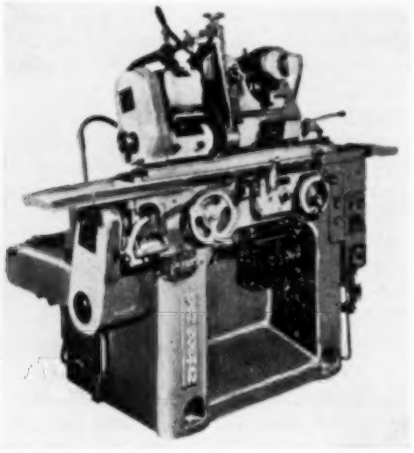
Norton Company, 1 New Bond Street, Worcester 6, Massachusetts.

Use postpaid card. Circle No. 45

Van Norman Machine Co. 351

The Van Norman 418 cylindrical grinder displays "all around versatility" provided by several important design advancements in the form of optional accessories, which according to the manufacturer permit crush forming and live or dead center operation. In addition, an optional sure-set taper indicating gauge allows exact swivel table adjustment to eliminate taper or produce a specific taper.

The crush forming attachment provides all the economies and advantages of sharper, longer cutting wheels, including contour grinding and less wheel dressing. The manually operated controls include rapid traverse down-feed and lock levers and a fine feed handwheel, graduated in .001-inches for precision forming.



Live or dead center operation may be achieved through use of a live or dead center headstock, which locks the spindle for dead center grinding.

All workheads feature a silent chain drive from jackshaft to spindle sleeve. The spindle face is arranged to hold chucks and face plates.

Van Norman Machine Co., Division of Van Norman Industries, Inc., 3640 Main Street, Springfield 7, Mass.

Use postpaid card. Circle No. 46

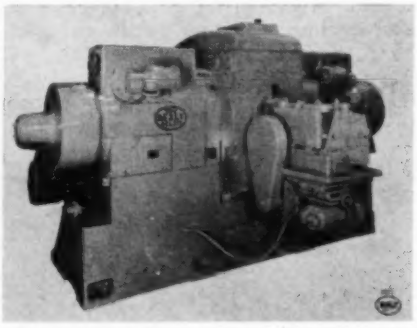
DOUBLE SPINDLE DISC GRINDERS

Besly-Welles Corporation 251

Newest Besly-Welles developments in high production disc grinding machines will be the types used in the production grinding of coil springs, carbide inserts, ceramic parts, and precision components requiring exceptional tolerances at high production speeds.

Featured will be the DH 4 double horizontal spindle disc grinding machine with the Besly exclusive spindle quill design.

The machine features simplified push-button operation, accuracy to tenths, simple 3-step abrasive change, automatic dressing and sizing, centralized one-shot lubrication, and an improved coolant system.



Other machines on display are the Model DV 2, described as a vertical adaptation of the horizontal disc grinder; Model TV 3, especially adapted for grinding the parallel ends of coil springs; and Model DH 2, particularly suited for through feed grinding and operations requiring clamping of parts to assure grinding surfaces square to a mating surface.

Besly-Welles Corporation, South Beloit, Illinois.

Use postpaid card. Circle No. 47

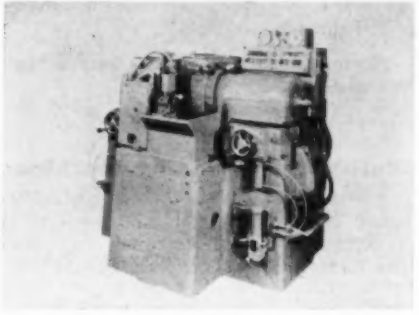
Gardner Machine Company 811

Seven new precision disc grinders will be demonstrated in action by the Gardner Machine Co. Six of these grinders employ two abrasive discs simultaneously to grind parallel the opposed faces of workpieces. Three are engineered to do this even though the areas of the opposed sides are unequal.

Two of the seven machines, Model 2H10 and Model 2H30, are illustrated.

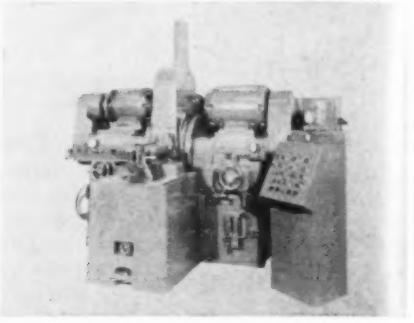
Automatic functioning without operator guidance is accented heavily. Special automation features include the loading of workpieces into a carrier, dressing of the abrasive discs, gaging of parts and adjustments of the machine to maintain tolerances, and workpiece positioning and discharge.

Manual operations in four models are restricted to loading and/or disc dressing. The other three are completely automated.



The 2H10 precision double horizontal spindle disc grinder is a completely new machine, automatic except for disc dressing. It is said to grind opposing faces of small parts such as instrument bearing races parallel to .000025" at a rate of 5,000-6,000 per hour. Stock removal rate on these races is .006" to .008".

The completely automated Model 2H30 double horizontal spindle disc grinder (below) loads and indexes universal joint spiders, grinds each pair of trunnion ends flat and parallel, and automatically keeps abrasive discs dressed and advanced to compensate for wear.



According to the manufacturer, the machine grinds 2,400 complete spiders parallel to tolerances of .0001" to .0002", with stock removal of .015" over-all.

A 25 hp motor drives each 30" disc. Each of the 20 stations on the chain hold-down rotary fixture is an automatic centering V-block fixture. Carbide inserts minimize wear.

Gardner Machine Company, Beloit, Wisconsin.

Use postpaid card. Circle No. 48

DRILL SHARPENING MACHINES

Leland-Gifford Company 631

A new high precision "Drill Point Master" twist drill grinder, that will produce or reproduce a drill point of any specified geometery on drills from No. 80 (.0135") to .250" will be shown for the first time.

This new unit has precision adjustments for locating the drill in reference to the grinding wheel, indexing the drill 180°, obtaining any desired point angle from 60° to 180°, any relief angle from zero to 26° and accurately thinning the point. It is particularly valuable, according to the manufacturer, for sharpening drills to be used on the newer super alloys and exotic materials.

Leland-Gifford Company, 1001 Southbridge Street, Worcester 1, Massachusetts.

Use postpaid card. Circle No. 49

Oliver Instrument Company 342

Four models of drill pointers, three of them new, will be shown by Oliver Instrument Company.

The standard Model "600" drill pointer features the Oliver point with increased clearance at the center of the drill. Capacity is ½" to 3". The unit can grind two, three, and four flute drills, has provisions for variable clearance and variable included point angles. All cutting lips of drill are ground in one continuous motion.

This machine can also be supplied with automatic infeed, designed for customers having a predominance of large size drills to point. Both of these models are new, have not been previously exhibited.

Oliver will also show both a standard and a new heavy duty No. 21 drill pointer, basically for 3/32" to ½" drills, though smaller ones can be sharpened if a pin vise is used.

Each unit has a self-contained diamond wheel dresser, and both can produce variable clearance and variable included point angles.

The new heavy duty machine is for Oliver type points having increased clearance at the center of the drill, while the standard model produces the conventional constant clearance drill point.

Oliver Instrument Company, 1408 East Maumee Street, Adrian, Michigan.

Use postpaid card. Circle No. 50

FORM GRINDERS

Jones & Lamson Machine Company 839

New Jones & Lamson automatic form grinders will be featured. Perpetual Form Control (PFC) with cemented diamond cutters will be employed to show off the advantages of high production, close tolerance grinding, with no time out for wheel dressing.

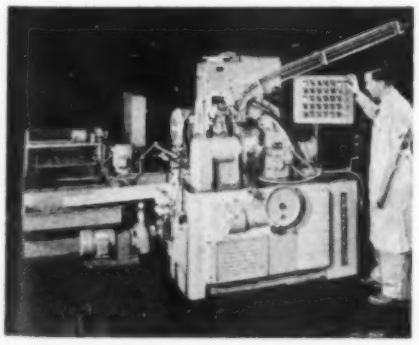
A new PFC dresser with up to 12" of width for CDP cutters is one of the features of the new Model E-3.

Jones & Lamson Machine Company, 522 Clinton St., Springfield, Vermont.

Use postpaid card. Circle No. 51

The Sheffield Corporation 201

The Model 182 Crushtrue® Multi-Form Grinder is a new machine which automatically grinds cylindrical forms on two or four parts simultaneously at wheel speeds of 9,200 sfpm and faster. It is being demonstrated for the first time.



The machine can be used on a wide variety of parts and sizes, such as water pump shafts, snap ring grooves in needle bearing cups, snap ring grooves and seal grooves in transmission shafts, and similar applications.

A number of these grinders presently in use are reported to be grinding similar configurations with .050 stock removal on 2000 automotive valves per hour, or two parts every 3.5 seconds.

The machine uses grinding wheels up to 20" in diameter, up to 5¼" thick, with an 8" hole. Wheel hardness up to "U" grade can be used.

Maximum work diameter is 2¼".

The Sheffield Corporation, Subsidiary of Bendix Aviation Corporation, Box 893, Dayton 1, Ohio.

Use postpaid card. Circle No. 52

GAGES

The Sheffield Corporation 201

Out of a wide variety of classifying and segregating machines and instruments and gages, the Sheffield Automatic I. D., O. D., and Radial Play Gage has been selected for review.

This three column Precisionaire® instrument simultaneously measures bore and outside diameters and radial play of an assembled ball bearing, indicating each inspection in its own gaging column.

Gage capacity ranges from R2 to and including R18 bearings. Interchangeable tooling is used for different bore and O. D. sizes.

The gage, said to be the first to combine the three inspections into a single automatic machine, will inspect up to 1200 bearings an hour.

The Sheffield Corporation, Subsidiary of Bendix Aviation Corporation, Box 893, Dayton 1, Ohio.

Use postpaid card. Circle No. 53

GEAR GRINDERS

Michigan Tool Company 945

The Michigan Tool Company's display will feature the Model CGG 16x18 FA Crown Gear Grinder. Also included in the display will be one of the new deburring and chamfering machines, the Series 482-A for spur and helical gears, introduced in 1960.

Shown by the Gear Grinding Machines Division, the new Model CGG 16x18FA crowning gear grinder is fully automatic, including the wheel dressing cycle.

After a rough grinding cycle is complete, the gear is automatically semi-finished and/or finish ground, with all grinding rates pre-set.

The deburring and chamfering machines operate on semi-automatic cycles. Two reinforced grinding wheels, powered by air turbines, are counterbalanced to follow edge contours of

both tooth faces simultaneously. The gear reducer cycle can be pre-set to drive the gear through the proper number of rotations to achieve the desired degree of chamfer.

Michigan Tool Company, 7171 East McNichols Road, Detroit 12, Michigan.

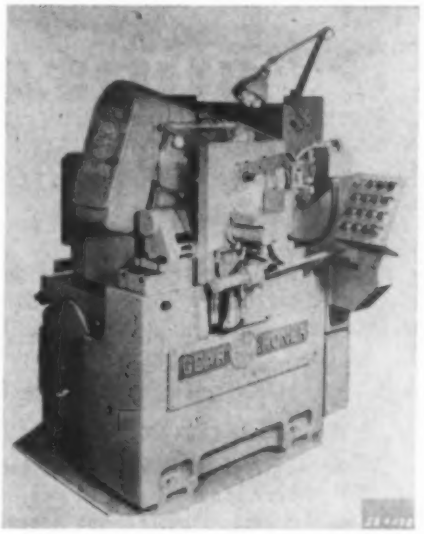
Use postpaid card. Circle No. 54

GEAR TOOTH HONING MACHINE

National Broach & Machine Company 1430

Model GHD-12-in. gear tooth honing machine is an improved model that was announced earlier this year and is being displayed in the Exposition for the first time.

The show model will be equipped with an automatic loader for honing small helical pinions. This machine has the work mounted on its bore and faces.



The honing tool is on a slide behind the work table. The honing tool drives the work gear in both directions of rotation while the honing head reciprocates back and forth.

Four separate methods of honing hardened gears are provided by the Model GHD machine. These include:

1. Honing with backlash in conjunction with a patented

locked honing head.

2. Zero-backlash operation with precision pressure control in conjunction with the patented honing lock.
3. Constant-pressure operation with a unique automatic mechanical wedge-type back-up eliminator.
4. Constant-pressure operation with overload relief provided by an adjustable leaf spring back-up protector.

Calibrated controls provide for accurate setting of vital honing pressure. The machine is made in either semi-automatic or fully automatic types, the differentiation being in the method of loading.

Gears from 4 to 20 diametral pitch ranging in size from 1-in. to 12-in. can be honed on the machine. The maximum distance between centers is 10¼-in.; cutter head stroke is 5½-in. maximum. The honing tool is 10-in. diameter. Floor space for the Model GHD honer is 50-in. by 51-inches.

National Broach & Machine Company, 5600 St. Jean Avenue, Detroit 13, Michigan.

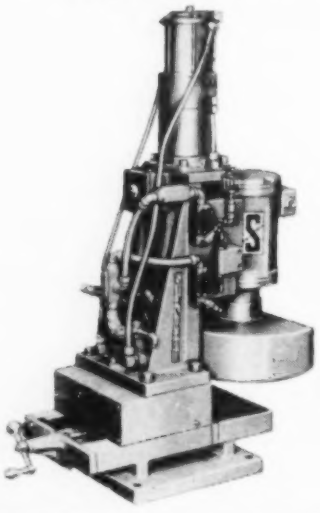
Use postpaid card. Circle No. 55

GRINDING SPINDLES AND ACCESSORIES

The Standard Electrical Tool Co. 1450

Standard Electrical Tool is exhibiting a wide variety of precision spindles, single and compound feeds, and accessories such as micrometer dials, swivel work and/or mounting bases, accordion protectors, wheel holders, and wheel guards.

These individual components are also being shown in combinations to identify the building-block features to satisfy individual production problems.



For grinding and other metal removal operations, the precision spindles are of individual design. In addition, there is a line of work heads for all conventional types of chucking equipment.

The upper photo shows a swivel work and/or mounting base. Cyclical traverse with adjustable stroke is represented in the lower photo. The hydraulically controlled air cylinder assembled on the vertical feed has a complement of equipment to satisfy a 2" reciprocating movement 12 times per minute.

Standard Electrical components are also included in machine tools elsewhere in the Exposition.

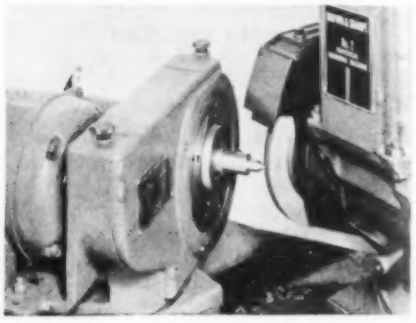
The Standard Electrical Tool Co., 2488-96 River Road, Cincinnati 4, Ohio.

Use postpaid card. Circle No. 56

GRINDING EQUIPMENT

Brown & Sharpe Mfg. Co. 452

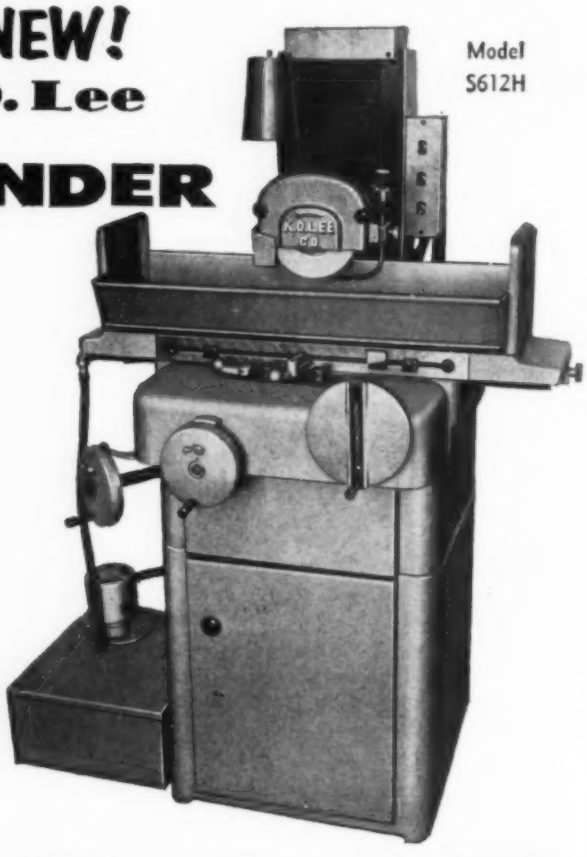
A new grinding machine headstock, using hydrostatic bearing design, will



(Continued on page 30)

Announcing the NEW! K.O. Lee SURFACE GRINDER

Model S612H



features:

★ A low cost precision grinder designed to handle most of the work ordinarily done on larger machines.

★ Spindle has duplex pre-loaded heavy duty ball bearings on each end. Spindle is driven with O-ring type belts for smooth operation.

★ Heavy cast iron construction throughout.

★ Extra length V and flat table ways distribute weight over greatest practical area for maximum table support and permanent accuracy.

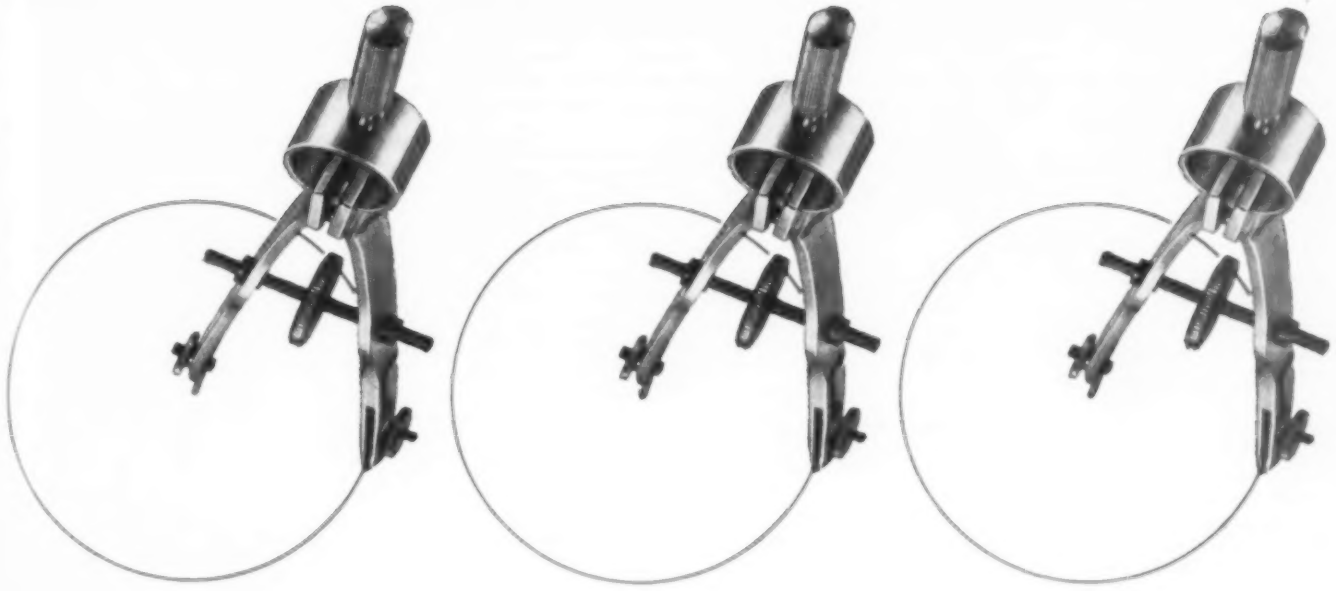
★ Table Ways are continuously lubricated, a definite improvement over the one-shot system.

Finest accuracy and micro-finish obtainable.

WRITE FOR COMPLETE LITERATURE

K.O. Lee Company, Aberdeen, S.D.

Use postpaid card. Circle No. 226



POSITIVE DUPLICATION—EVERY TIME!

As surely as a drawing compass can produce identical circles, you can be sure of getting Positive Duplication with these CINCINNATI CENTERLESS GRINDING WHEELS—and with *all* CINCINNATI WHEELS.

This predictable uniformity is the result of Cincinnati's unique 36-step (PD)° manufacturing process. These rigid controls achieve tolerances for wheel inside diameters which are the "tightest" in the industry. Your (PD) WHEELS have better balance, require less dressing and last longer.

"PD" PAYS OFF FOR YOU

You can meet or beat demanding production schedules with the help of Positive Duplication, because you can reorder a CINCINNATI (PD) WHEEL and know that it will act and grind exactly like the original.

Whatever shape, grade and size you specify . . . centertype, centerless, internal, surface, toolroom or snagging wheel . . . you get Positive Duplication—Every Time!

CUT COSTS . . . CALL CINCINNATI

Cincinnati factory representatives are trained specialists, experienced in grinding job set-ups and operations. Their skills are at your service. Just call your CINCINNATI (PD) GRINDING WHEELS Distributor, or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

(PD) POSITIVE DUPLICATION

CINCINNATI° GRINDING WHEELS

°Trade Mark Reg. U.S. Pat Off.

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

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be exhibited by Brown & Sharpe to demonstrate the highest accuracy yet obtainable for roundness and end camming. It is claimed possible to grind round within ten millionths using this headstock.

Brown & Sharpe Manufacturing Company, Promenade Street, Providence 1, Rhode Island.

Use postpaid card. Circle No. 57

Norton Company **651**

A new automatic wheel balancer and a new automatic wheel contact accelerator will be demonstrated by Norton on a 10" x 18" Type CTU cylindrical grinder.

Although modern grinding machines and grinding wheels are made with inherent good balance, there are jobs where extra care must be taken to insure as perfect balance as possible. The Norton automatic balancer is said to accomplish this in five seconds time by an unskilled operator.

Interlocks are claimed to make the balancer completely safe. The unit requires no basic change in the wheel head design, according to the manufacturer, and spindle bearings are not disturbed.

The automatic wheel contact accelerator is designed to eliminate "grinding air" during an automatic grinding cycle if the particular workpiece is under the maximum expected size of work coming to the machine. It substitutes a faster feed for the grinding rate, at the end of the rapid traverse stroke, until the wheel actually contacts the work. The greatest savings can be expected when workpieces have a considerable variation in diameters.

Norton Company, 1 New Bond Street, Worcester 6, Massachusetts.

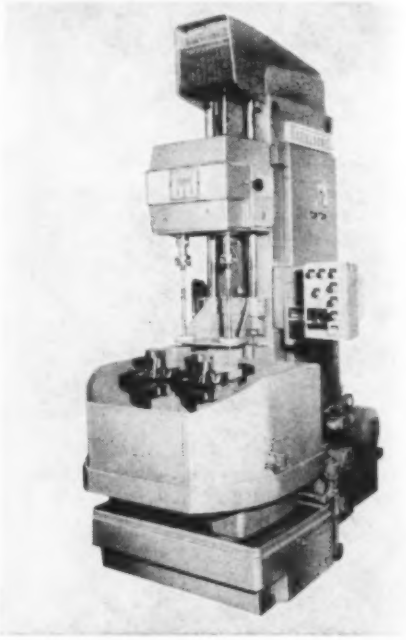
Use postpaid card. Circle No. 58

Use the Reader Service Card— or say you saw it in GRINDING and FINISHING

HONING MACHINES

Barnes Drill Company **152**

Three new honing machines will be introduced by Barnes Drill Co.



The single spindle Model No. 244 honing machine (above) will hone bores up to 4" in diameter at full stroke. This honer is available with stroke lengths of 15", 25" and 40", and with a choice of one or two spindles. For full automation, Model No. 244 can be supplied with a wide variety of fixtures and tables.

For honing bores ¼" to 1½" in diameter, Barnes will display a Model No. 10M1 honing machine. This unit has a 2½" stroke and a 10" swing. It can also be equipped with a full range of automatic equipment.

Newly designed for high production honing of small diameter bores is a Model No. 122 vertical honer. Equipped with a 12" stroke and a 12" swing, the

A NEW APPROACH TO BIGGER TIME SAVINGS

MULTI-USE, SOFT RUBBER BONDED ABRASIVES THE ONLY COMPLETE, COMPREHENSIVE STOCK LINE!

Brightboy's unique, time-saving abrasive-and-rubber action achieves exceptional precision results, improved product quality. Simultaneously BURRS, CLEANS, FINISHES, POLISHES. Bridges the gap between the grind and buff, frequently in one operation. Works all metals, wood, glass, laminated materials, some plastics.

Readily available Silicon Carbide and Aluminum Oxide grains—grades extra fine to extra coarse—in soft, semi-firm, firm and tough rubber binders. 49 numbers JOB-MATCHED to conventional and automation production methods.

NEW BRIGHTBOY CATALOG . . .

gives new and revised wheel sizes, center hole specifications conforming to American Standards safety specifications, machine speeds, grains and textures. No plant should be without this valuable reference catalog describing this revolutionary new concept of abrasive applications. WRITE FOR IT!

WELDON ROBERTS
Brightboy
RUBBER CUSHIONED ABRASIVES

BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.
95 North 13th Street Newark 7, N.J.

America's Pioneer Manufacturer of Rubber-Bonded Abrasives

Use postpaid card. Circle No. 228

new honer will handle bores up to 2" in diameter at a maximum stroke.

Infinite hone feed adjustment is controlled by a simplified electric hone expansion unit. Size consistency within .0002" from bore to bore is maintained by the BarnesdriL Plugmatic sizing unit.

Barnes Drill Co., 886 Chestnut Street, Rockford, Illinois.

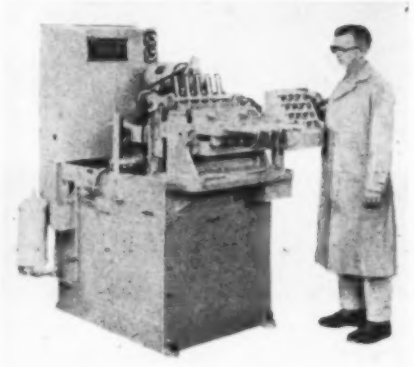
Use postpaid card. Circle No. 59

Micromatic Hone Corp. 747

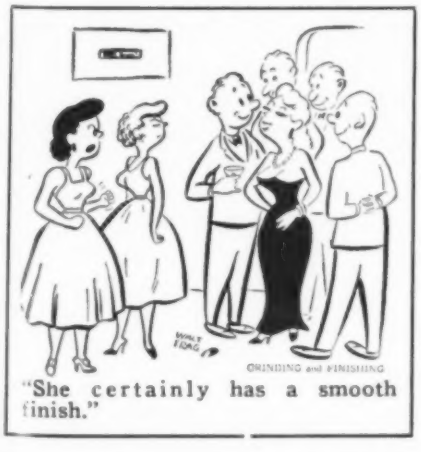
Microhoning machines and techniques to accommodate unique forms and shapes have been designed, built, and developed to productive capacities in the last five years. Existing Microhoning methods and tools were improved, and new equipment and products introduced.

The machines being exhibited in the Micromatic booth are automated in varying degrees; some models are equipped with modified transfer systems to illustrate the adaptability of Microhoning equipment.

Precise processing of an anti-friction bearing inner ring's functional surfaces



can be accomplished in two steps on two automated Microhoning machines. After the I.D. is Microhoned straight and round on a model 738-C (using diamond abrasives), the raceway is finished concentric with the bore on a model 2HRI-5 (five spindle machine above). Curvature, macrogeometry (surface roughness and lay) are improved.



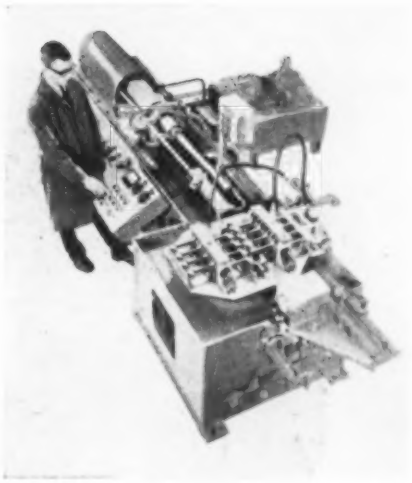
"She certainly has a smooth finish."

The recent adaptation of the stack Microhoning principle to horizontal machines allows precise, economical production of short bores. The idea is not new: the fixture holds several parts in line and they are Microhoned as though they were one long bore.

The Micromatic model 5HX16 (right), a single spindle, horizontal machine, can be readily fixtured for this application, to take advantage of the 3 fundamental benefits of the stack approach:

1. High production with low initial capital investment
2. Abrasive economies
3. Machine simplification resulting in less maintenance, etc.

A specially designed Microhoning tool is "piloted" through the stacked bores by plastic guides. To increase stone life and accuracy a slightly longer-than-normal abrasive is used. Automatic sizing is easily added to this model.



Micromatic Hone Corporation, 8100 Schoolcraft Avenue, Detroit 38, Mich.

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(Continued on page 38)

New model 24 Lapmaster

new compact machine design... more production lapping efficiency, yet takes less floor area ... easy hand-wheel adjustment of conditioning rings to keep lap plate flat.

new, larger, adjustable work table... wrap-around design for fast loading, unloading from almost any position ... pneumatic lifts to facilitate work handling or to provide extra down pressure.

new abrasive distribution system... pressure pump at constant head for uniform deposits at lapping stations ... assures uniform cutting action to control the amount of stock removal ... always maintains correct abrasive mixture ... provides adjustable flow control.

Compound and vehicle distribution pump and tank swing out for filling ease, swing in, out of the way, during production.

Lapmaster ...THE MACHINE THAT PUT PRECISION LAPPING ON A PRODUCTION BASIS

SEE THE NEW LAPMASTER AT BOOTH 550, COLISEUM MACHINERY SHOW, CHICAGO, SEPTEMBER 7-15. ALSO ... REQUEST OUR NEW CATALOG OF OTHER LAPMASTERS.

A product of
CRANE PACKING COMPANY
6417 Oakton Street, Morton Grove, Illinois (Chicago Suburb)
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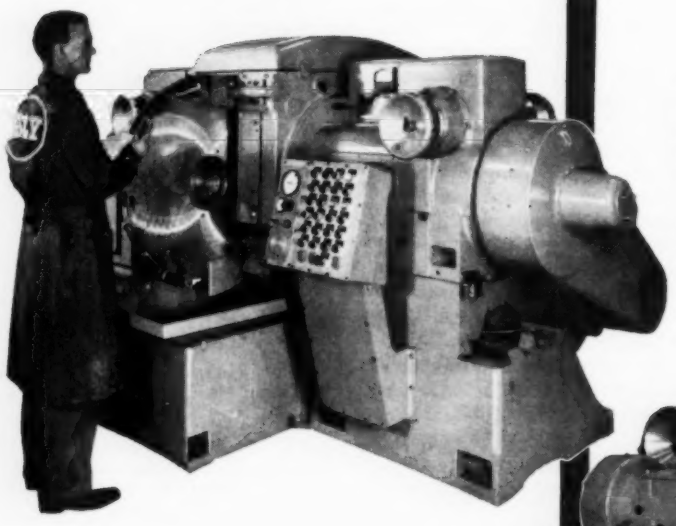
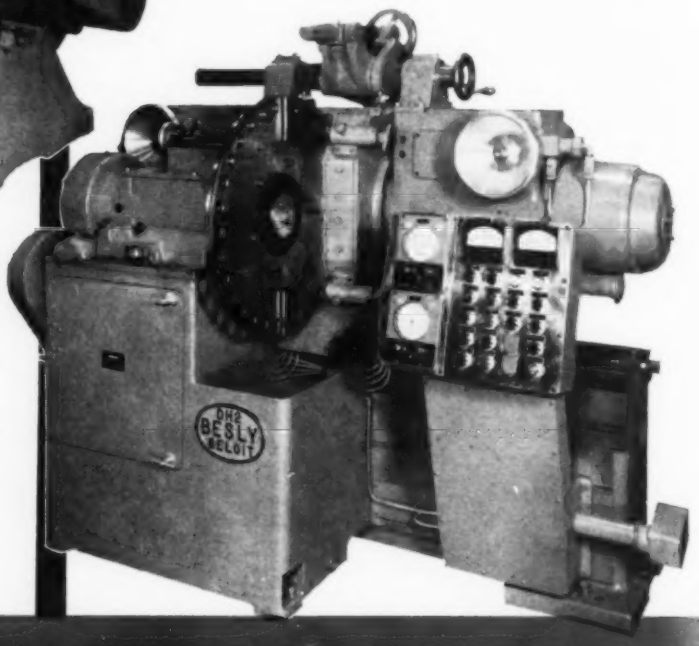


The **Besly DH4** Double Horizontal Spindle Disc Grinder squaring and finishing hardened, high-speed steel tool bits at 600-per-hour rate. Size and parallelism were held to ± .001". Stock removed was .012 per side. Bits distorted by heat treatment were quickly trued up by the twin discs.



Besly DH2 Double Horizontal Spindle Disc Grinder. A smaller version, ideally suited for grinding carbides and ceramics as well as other materials. It features automatic sizing, loading and unloading; excellent for thru feed grinding along with operations requiring clamping of parts such as wrist pins, valve stems, etc., to square grinding surfaces to a mating surface.

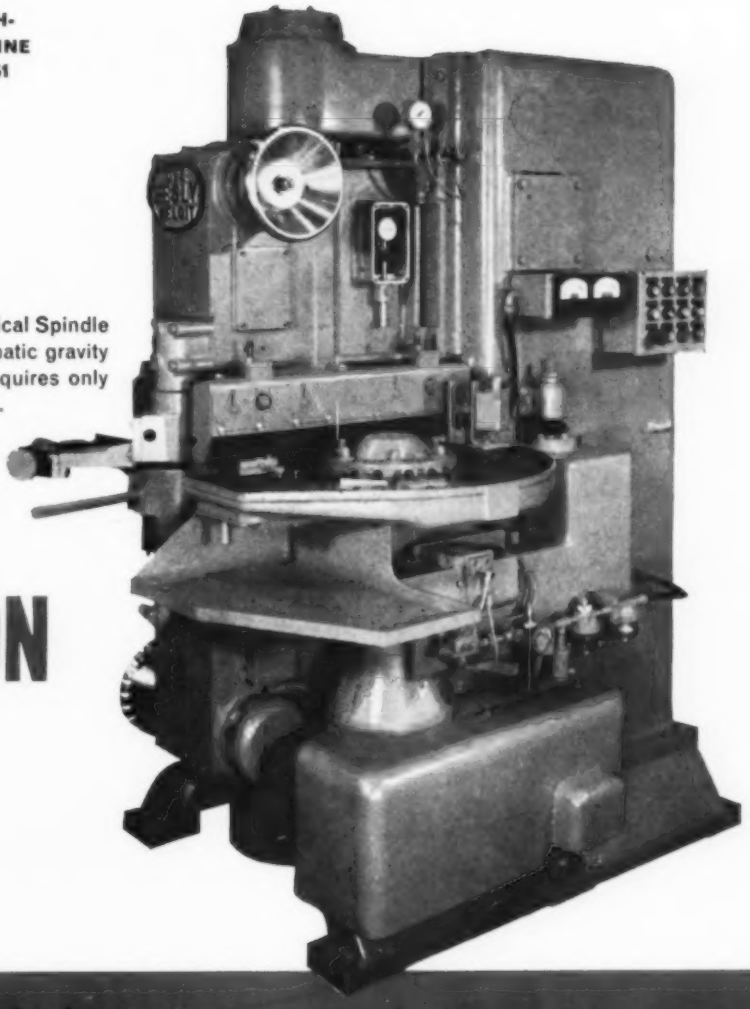
for maximum accuracy and productivity....

Besly TV3 Tandem Vertical Spindle Disc Grinder. This new machine has two pair of heads, one with roughing discs for heavy stock removal, the other for grinding to required finish and tolerance. The feed wheel, mounted on the rotary unit is arranged to oscillate and produce "orbital grinding action" for more efficient grinding, extended disc life and less frequent abrasive dressing. Although the TV3 has many applications, it is of greatest interest to spring manufacturers for grinding spring ends square and finishing to size and flatness. The machine can be purchased with only one pair of heads, and a second pair can be added to double the capacity.

"Precision performance with savings in time and labor" aptly describes the benefits you will realize with a BESLY Double Horizontal Spindle Disc Grinder. Long recognized as superior in the industry, the Besly DH4 Grinder has many features that recommend its application to exacting grinding problems. Exclusive precision quill and clutch infeed provides feed increments calibrated in millionths. Discs can be changed in 30 minutes without disturbing setup, cutting downtime in half. Dressing time is only four minutes, a fifth the usual time! Simplified push-button operation and controls, built-in dials, gages, meters to indicate abrasive conditions, motor load, etc., assure precise results, dependable grinding production.

BE SURE TO SEE THESE BESLY HIGH-PRECISION GRINDERS AT THE MACHINE TOOL EXPOSITION . . . SPACE NO. 251

MMTPE — MODERN MACHINE TOOLS — PRODUCTION EFFICIENCY



Besly DV2 Double Vertical Spindle Disc Grinder with automatic gravity feed and discharge. Requires only 8-ft. by 8-ft. floor space.

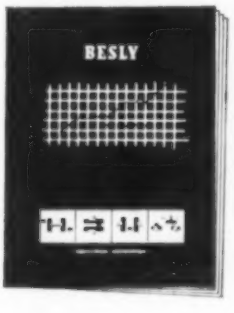
for

PRODUCTION DISC-GRINDING

...Better see Besly! DOUBLE VERTICAL GRINDERS

The Besly DV2, illustrated is representative of the new line of double-vertical spindle disc grinding machines now being manufactured in our South Beloit plant. Designed for production use, this unit is shown grinding top and bottom of $\frac{3}{8}$" thick throw-away carbide inserts at a rate of 3,000 passes an hour. Three passes are required to remove .016" of stock. *Tolerances on the final pass are held within .0003" for flatness, parallelism and size, with a 4 micro-inch finish.*

The DV2 will grind parts that range from .050" to $2\frac{1}{2}$" in thickness and .375" to 3" in diameter. In addition to grinding carbides or hard ceramics that require diamond abrasives, the DV2 also grinds stampings, plastic parts, alnico magnets, bearing races, coil springs, carbon parts and the like with resinoid-bond abrasive discs.



WRITE FOR THIS NEW illustrated catalog describing Besly Disc Grinders.

BESLY®

BESLY-WELLES CORPORATION

120 Dearborn Avenue, South Beloit, Illinois

Grinders and Abrasives • Taps • X-Press Tapes® • Drills • Reamers • End Mills
Tool Bits • Gages • Carbide Tipped Tools • Blanks • Inserts • Holders

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Whadd'ya read!

ANOTHER NORTON PRODUCT

Take your pick of this **FREE** right-from-the-horse's mouth information on coated abrasives described on the card opposite. These are all facts you *know* are useful because they come from the authoritative source — BEHR-MANNING. Keep in touch — read about the how-to-do-it happenings that can lead to better production and bigger profits. Check and mail the adjoining post card today. BEHR-MANNING Co., Troy, N. Y., a division of Norton Company.

BEAR BRAND
Coated Abrasives

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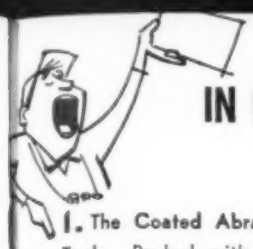

THE LATEST IN COATED ABRASIVES INFORMATION

1. The Coated Abrasive Belt — Its Use in Machine Tools. Packed with simple diagrams and clear-cut photos, it describes 13 notable recent developments in the use of coated abrasive belts.

2. Production Problems Solved Here. Describes each piece of advanced equipment used in the Behr-Manning Methods Demonstration room. Read it for ideas on getting more out of your own machine tools.

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4. Production Progress. Jumbo-sized coverage of metal grinding and polishing. Articles by experts in various methods treat each subject in detail.

5. Coated Abrasives Today. Shows the range and variety of these materials for every grinding and polishing job.

6. Flat Grinding and Polishing with Wide Belts. A manual describing the advantages and techniques of this important process. Concise treatment through pictures and captions simplifies all the major developments that have recently added to its adaptability, speed, and efficiency.

7. Metal Grinding and Finishing with Coated Abrasive Discs. Covers one of the most basic operations in your plant. Gives you all the pointers recommended by experts, shows where and how disc grinding can be used to speed operations.

8. Behr-Manning Industrial Films. A picture is worth a thousand words, and these films give you step-by-step pictures of every coated abrasive technique. They're all listed and described in this handy book that belongs in the front row of your training literature.

9. Abrasive Tech. Here's the latest issue describing the newest developments in coated abrasive machines and methods.

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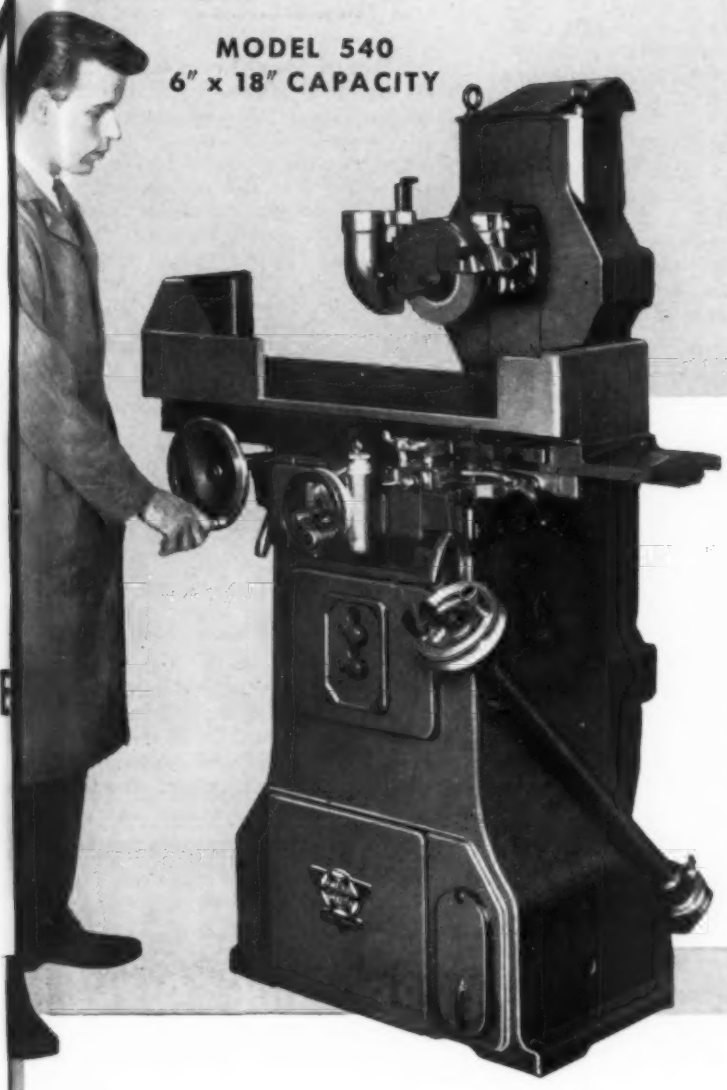
HYDRAULIC SURFACE GRINDER

MODEL 540
6" x 18" CAPACITY



MICRO MATIC
HONE CORPORATION
DETROIT MICHIGAN
MANUFACTURED BY
JONES-SHIPMAN
LEICESTER, ENGLAND

ACCURACY...
EFFICIENCY...
EASE OF OPERATION

This machine has all the essential qualities required to provide high caliber surface grinding. Its simplicity of design provides ease of operation while inherent accuracy and efficiency assure excellent grinding performance. Thousands of these grinders have been purchased by discerning users in every part of the world.

FEATURES:

- Completely centralized controls within easy reach of operator.
- Patented low-pressure, long-life Hydraulic System operating from self-contained motor-driven pump unit.
- Table traverse rates variable from 5′ to 40′ per minute. Smooth and shockless reversing at maximum speeds.
- Cross-feed automatically variable from .01 in. to .07 in. per stroke.
- Hand controls provided for both traverse and cross-feed. Micrometer adjustment to cross-feed in .0001 in. divisions.
- Vertical adjustment of wheelhead controlled by conveniently placed handwheel having a micrometer knob adjustment in .0001 in. divisions.
- Wheelhead slide operates on ball bearing rollers running on precision ground bars providing absolute sensitivity of vertical feed.

Automatic vertical wheelhead feed and electric lift can be fitted to standard machine as an extra feature. Also, numerous other attachments including form tool grinding equipment are available to assure full versatility.

FOR FURTHER INFORMATION, WRITE FOR YOUR COPY OF BULLETIN C183.

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PRECISION PRODUCTION THROUGH MICROHONING
MICRO MATIC

MICROMATIC HONE CORP.

8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN

MACHINE TOOL SHOW

INTERNAL GRINDERS

Bryant Chucking Grinder Company **936**

Two Bryant Model "B" Miniature Centalign internal grinders will be shown. One will be set up to grind bores, and the other will demonstrate the grinding of raceways in miniature bearing races.

Model "B", occupying only 8¼ sq. ft. of floor space, features Bryant's exclusive disc drive workhead and quick-change "packaged tooling."

Another feature is the "New Wheel Dress" mechanism, which automatically dresses to proper size the extremely small wheels used.

Bryant Chucking Grinder Co., 60 Clinton St., Springfield, Vermont.

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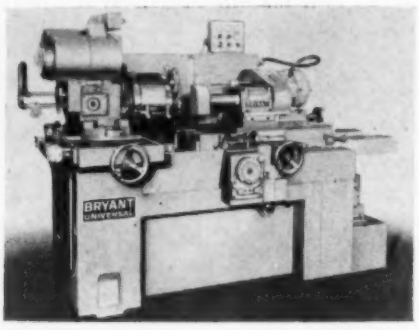
Universal Internal Grinder

The Bryant Universal is a low-cost, general purpose machine for I.D., O.D., internal face and rotary face grinding. Swing inside the standard chuck guard is 12", with a maximum grinding stroke of 16" available.

New features not found on low cost machines are said to be incorporated in the Bryant Universal. One is the compound wheelslide construction, which places the traverse slide above the cross slide. This cuts the reciprocating mass to a minimum, and allows the use of feed controls which do not



reciprocate with the traverse motion of the wheelslide.

A complete line of machine accessories is available, including a micrometer attachment for accurately setting taper. This eliminates the need for gage block combinations for each angle desired.

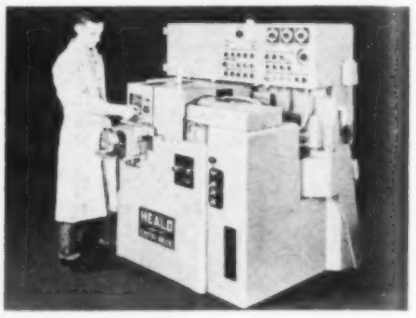
Bryant Chucking Grinder Co., 60 Clinton Street, Springfield, Vermont.

Use postpaid card. Circle No. 62

The Heald Machine Co. **924**

Heald will show two internal grinders, Model 090 and Model 171A, which are said to be capable of handling internal work with increased upper and lower limits, as well as having better feed methods, coolant control, and greater compactness.

Model 090 Centri-Matic is a miniature internal grinder for bearing races and small cylindrical parts. It permits handling work 0.040" inside diameter and 0.050" minimum outside diameter. Design advances also include shoe-type centerless workholding, wheelhead speeds up to 150,000 rpm, electronically controlled machine functions, and isola-



WE ARE ACTUAL MANUFACTURERS of EVERY BOND TYPE and SIZE DIAMOND WHEEL...

...we do not simply select a "suitable" size and shape per given bond — we manufacture all three bonds in all sizes as evidenced by our catalog #160. Write for it today.

Preferred for Performance

THE PAUL L. KUZMICK COMPANY

271-279 Grove Ave., Verona, N. J.

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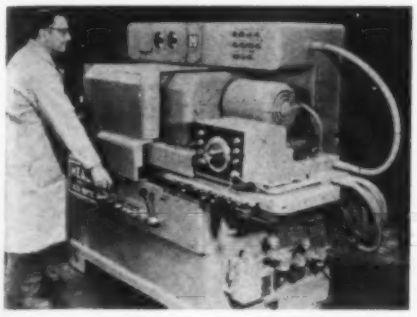
tion of heat-producing equipment for improved accuracy.

The Heald Model 171A internal grinder provides a workswing to 8" O. D. and 90° included angle. The new design, with the wheelhead mounted on the cross slide and fed into the work, is said to allow heavier roughing



cuts, faster and more accurate feeds than with other models. Infinitely variable compensation for wheel wear (0 to 0.004") is claimed to promote longer wheel life and improved tolerance control. The 171A is available in Size-Matic, Gage-Matic, or plain models.

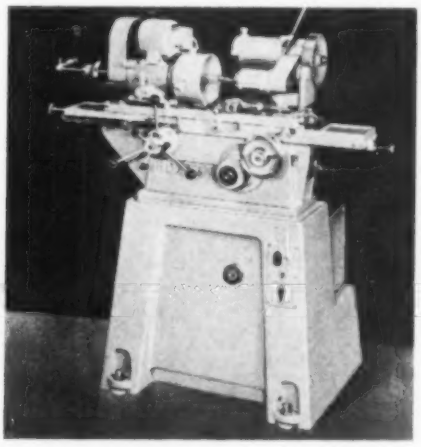
The Heald Machine Company, 14 New Bond Street, Worcester 6, Mass.

Use postpaid card. Circle No. 63

Rivett Lathe & Grinder, Inc. 1210

The Rivett display will include two types of internal-external grinders, Model 84, and two machines of Model 1024, one set up for internal grinding, the other for external grinding.

Flexibility of operation and the simplicity of design of Model 84, according

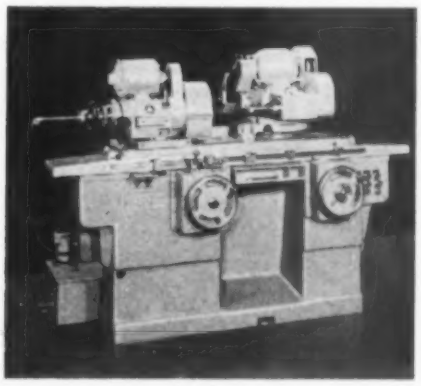


to the manufacturer, reduce set-up time for the diversified jobs of tool-room and die shop.

The machine mounts interchangeable wheelheads for internal and external spindles. Hole capacity is 3" diameter. External capacity is to 3" diameter.

Model 1024 internal and universal grinder (upper right) also features short set-up time. Its double-end wheelhead swivels 180° for quick conversion to internal or external work.

The machine grinds holes up to 9" in diameter, to tolerances of plus three "tenths", minus nothing. External capacity is to 12" diameter.



Rivett Lathe & Grinder, Inc., P. O. Box 7, Brighton 35, Boston, Mass.

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Van Norman Machine Co. 351

A new precision ball bearing race grinder, unparalleled for its ability to grind inner races of miniature bearings to tolerances of less than 50 millionths of an inch with approximately a three or four microinch finish, will be exhibited by Van Norman Machine Co., Division of Van Norman Industries, Inc.

Called the Lectro-Cam Model 1-M super precision ball bearing race grinder, the unit has produced bearing

(Continued on page 42)

WE ARE MANUFACTURERS of RESINOID and RUBBER BONDED GRINDING and POLISHING WHEELS...

...we have pioneered

★ reinforced rubber grinding wheels for high speed operation

★ combination grinding and polishing wheels for the cutlery industry

★ grinding and finishing wheels for the aircraft industry

"a leader in the industry"

For complete information write for literature or factory representative

PEKAY ABRASIVES, INC.

271 Grove Ave., Verona, N. J.

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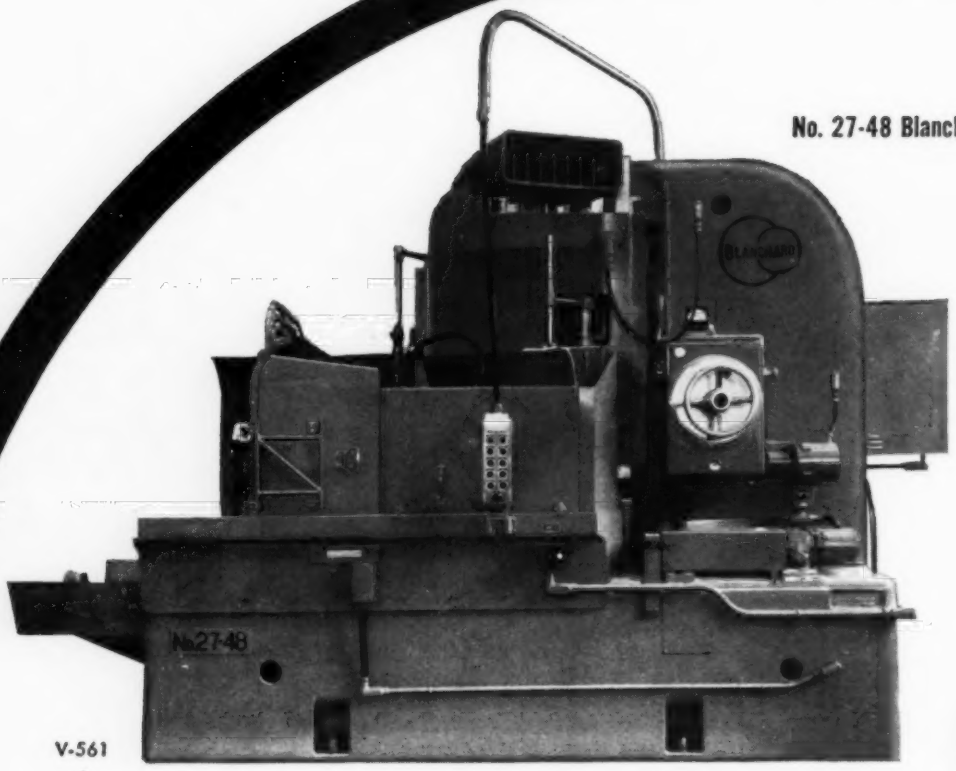
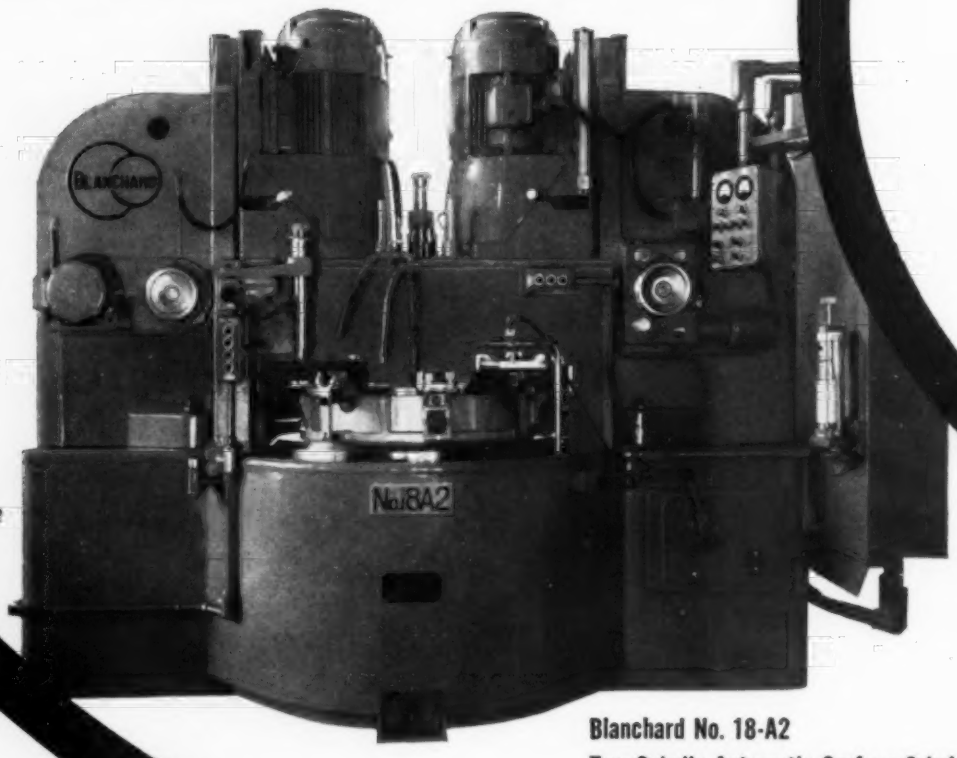
No. 27-48 Blanchard Surface Grinder



V-561



V-562

Blanchard No. 18-A2
Two-Spindle Automatic Surface Grinder

if grinding efficiency
is important to you . . .

DON'T MISS SEEING THESE NEW BLANCHARDS AT CHICAGO!

Two entirely new Blanchard Grinders of advanced design will be introduced at the NMTBA Exposition in Chicago. Both machines offer new features and high production capabilities that will interest everyone whose operation requires high-speed, precision grinding.

Booth No. 1209

BLANCHARD

The Blanchard Machine Company
64 State Street, Cambridge 39, Mass.

The No. 27-48 Blanchard Surface Grinder is an entirely new size of Blanchard Grinder. This machine will be equipped with hardened base ways, will be of "dry base" design, and will have a conveyor-type sludge tank mounted at the rear. This machine has a 48″ diameter magnetic chuck with a clearance of 52″ inside of the waterguards, 12″ vertical range and a 27″ segment grinding wheel. This grinder has a 75 HP main spindle motor. Coolant is directed both to the inside and outside of the grinding wheel. These features provide ample power, rigidity and coolant flow for heavy stock removal on a large variety of work pieces. This machine affords great accuracy, extreme flatness and fine finish.

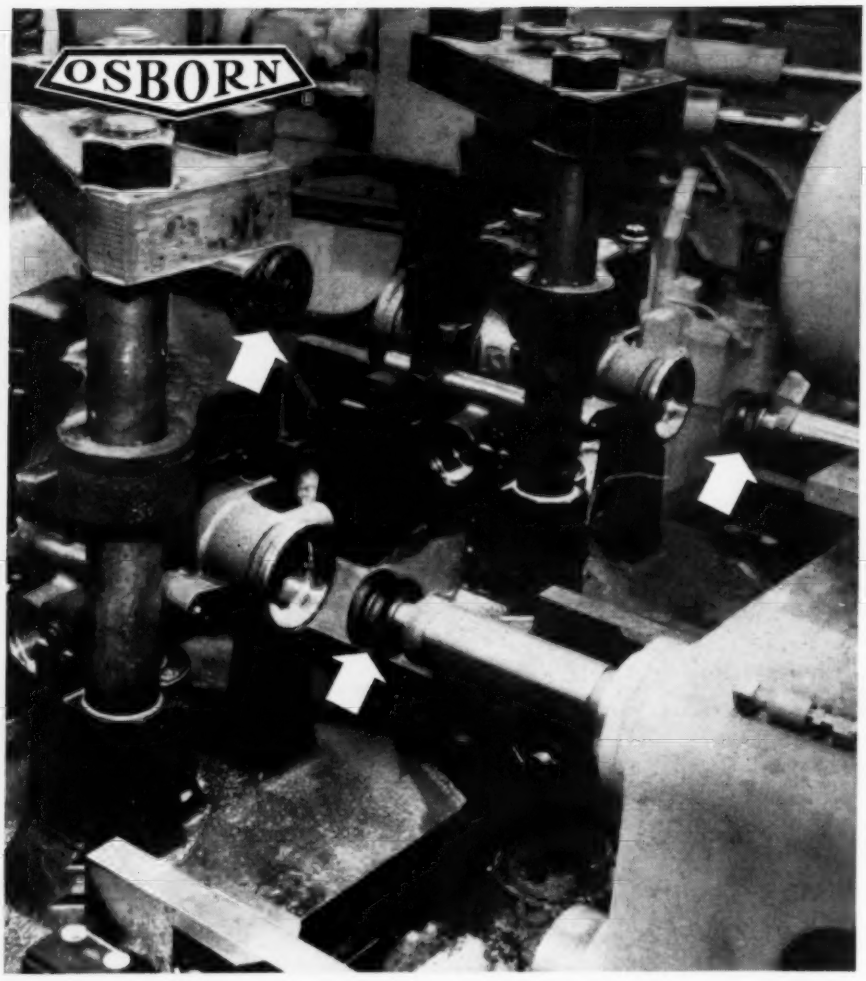
This grinder will be equipped with a motorized Single Cut Device and a floor-mounted control panel.

Other features include: a hand-operated Trabon lubrication system for the spindle bearings, wheel dresser and head ways; automatic Bijur lubricator for the hardened base ways; and oil reservoirs for the table bearing and chuck rotation units.

The No. 18-A2 Blanchard Surface Grinder is a new Two-Spindle Automatic Surface Grinder. This new grinder is of a "dry base" design: in operation all coolant and chips flow to an outside settling tank or central coolant system. The design provides easy access to the grinding wheel area. Push button stations and operator's control are conveniently located for ease of set-up. All controls are interlocked to assure complete safety. A warning light flashes at the operator's station when grinding wheels require replacement. The grinder is equipped with 30 HP foot-type spindle motors.

The grinder has a plain table for mounting of special work-holding fixtures, and a six-speed gear box for table rotation, with provision for locking this in a pre-selected speed. The feed rate in thousandths of an inch per minute can also be locked. The grinder at the Exposition will have an eight-station fixture, each station handling a different work piece to demonstrate the ingenuity of Blanchard fixture design. This table will be rotating to demonstrate clamping and unclamping of the fixtures, and to show the path of the work pieces through the grinding wheels and under the wheel control calipers.

Use postpaid card. Circle No. 238



In this automatic twin setup, Osborn TY® brushes are advanced into both ends of a pair of valve housings without surface contact. The drive head oscillates the brushes around the ring groove contours, then retracts . . . all automatically.

HIDDEN BURRS knocked off

in 5½ seconds with new OSBORN TY® Power Brushes

This large manufacturer of automotive power steering equipment uses Osborn TY® brushes to deburr double internal ring grooves in both ends of these valve housings. Former off-hand methods required lots of time . . . effort. Still, high quality standards were hard to obtain.

Today deburring is done automatically with Osborn TY brushes . . . in just 5½ seconds. *High quality results are uniform . . . consistent.* These tough, durable TY brushes operate 16 hours a day in a 96-station automatic transfer machine. Even in this rugged service, brush life runs 2½ to 3½ weeks.

An **O**sborn **B**rushing **A**nalysis—made in your plant now at no cost or obligation—is the first step toward improving your metal finishing operations of every description—deburring, cleaning, polishing, precision blending. Write or phone for details. *The Osborn Manufacturing Company, Dept. G-6, Cleveland 14, Ohio.* Phone ENdicott 1-1900.

PRODUCTION ENGINEERING SHOW SEPT. 6-15 1950 NAVY PIER CHICAGO

OSBORN BOOTH 375-377

Osborn Brushes

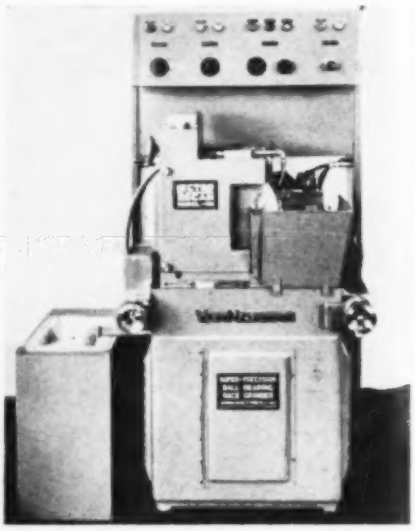
Metal Finishing Machines . . . and Finishing Methods

Power, Paint and Maintenance Brushes • Foundry Production Machinery

Use postpaid card. Circle No. 239

races to 7ABEC tolerances on a 6[illegible] thousandths diameter O.D. with a ball radius of .0165.

Industry integrated design provides high-speed production at lower cost. The design of the 1-M race grinder was based on recommendations of major bearing manufacturers, which revealed



the need for a machine that would be compatible in size to the part being ground; that would be as mechanical as possible so as not to require specialists for servicing; and that would feature simplification and standardization of tooling to enable set-up time to be reduced to the absolute minimum.

Van Norman Machine Co., Division of Van Norman Industries, Inc., 3640 Main Street, Springfield 7, Mass.

Use postpaid card. Circle No. 65

LAPPING MACHINES

Norton Company **651**

The No. 12F Hyprolap high production lapping machine (Norton Company) is being shown for the first time. This machine is widely used in the manufacture of miniature precision bearings. It is being exhibited to suggest possible applications in other industries in the field of high production lapping of small parts in a two face abrasive lapping machine.

Automatic loading which has just been developed, makes it possible for one operator to run two or more machines. Up to this time it has been necessary to have one operator for each of the two workholders and usually an additional person to unload and inspect the work. The machine laps parts at the rate of approximately 4,000 pieces per hour, it is reported, so that operators have been kept very busy.

The new loader is adaptable to various sized parts and should have a very short payout period.

The machine itself has been said to be very successful in holding produc-

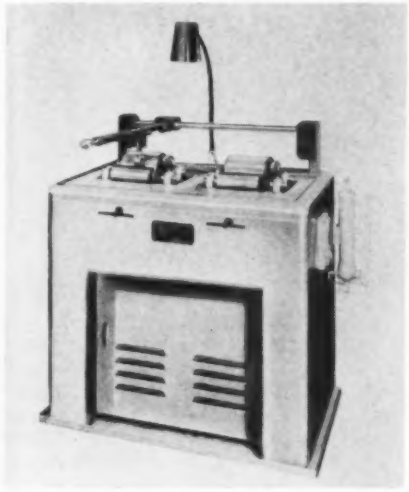
tion tolerances measured in millionths of an inch. Parts can be lapped to very close tolerances for size and parallelism as well as to low microinch finishes.

Norton Company, 1 New Bond Street, Worcester 6, Massachusetts.

Use postpaid card. Circle No. 66

Size Control Company 1120

Size Control Company's centerless lapping machine has been completely re-engineered, according to the manufacturer, though its operating principles remain the same.



Some of the improvements include an easily accessible belt tightener, a sturdier and more convenient cabinet housing, easily-adjustable, self-locking rolls, and special lapping rolls for carbides.

Size Control Company, 2500 West Washington Boulevard, Chicago 12, Ill.

Use postpaid card. Circle No. 67

Taft-Peirce Mfg. Co. 1426

Another machine tool with important refinements to be demonstrated by Taft-Peirce is the 24" semi-automatic lapping machine.

This device now has a unique plate mounting which allows dishing the plate as much as .03" to compensate for normal wear, or to achieve greatly improved results on some types of lapping jobs. The Taft-Peirce lapping plate is reversible, a feature which assures much longer life.

The compound tank system is also new with such features as separate drive motor; constant agitation, even when the machine is not running; and micrometer screw valve for flow regulation. The removable tank is completely self-contained so that changes in compound can be made in seconds if spares are available.

A manual lapping machine will also be demonstrated, as well as a Taft-Peirce back spot facer.

Taft-Peirce Manufacturing Company, 32 Mechanic Ave., Woonsocket, Rhode Island.

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A NEW "COMPACT" HITS THE MACHINE TOOL FIELD . . .

THE NEW HARIG 612 SURFACE GRINDER

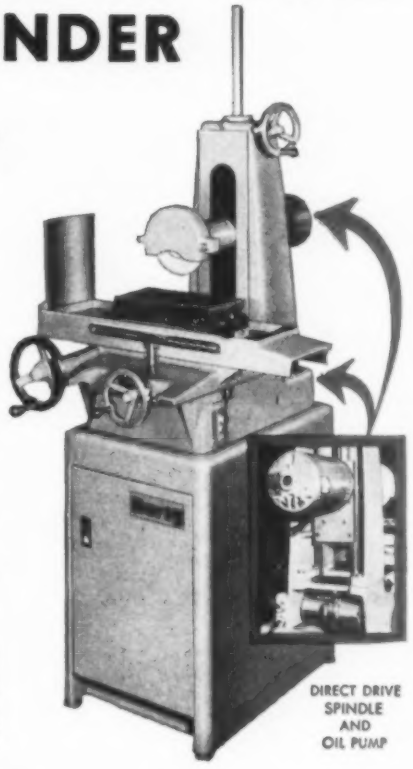
with

* **Automatic forced lubrication** goes into operation as soon as machine is started — triples life of the ways and preserves original accuracy.
* **Direct drive spindle** increases power . . . reduces vibration . . . no V-belts to replace.
* **Your choice of right or left hand longitudinal feed**

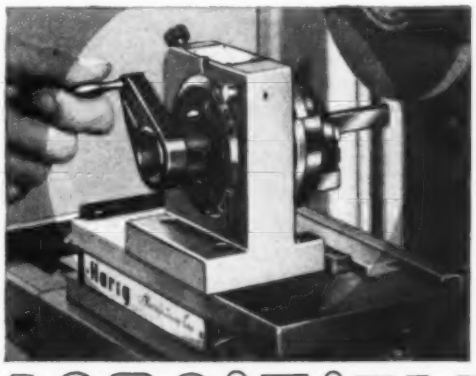
All Standard Equipment

The new 612 represents a break-thru in design and construction whereby Harig now offers industry a low-cost, precision surface grinder loaded with features usually found only on expensive models. Easy to operate . . . requires little maintenance . . . built with the precision quality you expect from Harig.

GET ALL THE FACTS . . .
Write for brochure on the Harig 612 Surface Grinder



DIRECT DRIVE SPINDLE AND OIL PUMP



WRITE FOR THE NEW GRIND-ALL BROCHURE

. . . AND HARIG'S NEW IMPROVED GRIND-ALL FIXTURE

Easily grinds irregular shaped perforators concentric with shank within ± .0001 accuracy. Also can be used for milling, boring, inspection, and radius dressing. New features include v-block adjusting screw and sine arrangement to obtain any desired angle.

WHATEVER YOUR TOOLING REQUIREMENTS . . . HARIG IS READY TO SERVE YOU!

ENGINEERING
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CARBIDE DIES
LAMINATION DIES
PROGRESSIVE DIES
MOLDING DIES
JIGS, FIXTURES & GAGES
SPECIAL MACHINING

Harig Manufacturing Corp

5769 W. Howard St. • Chicago 48, Ill.

Use postpaid card. Circle No. 240

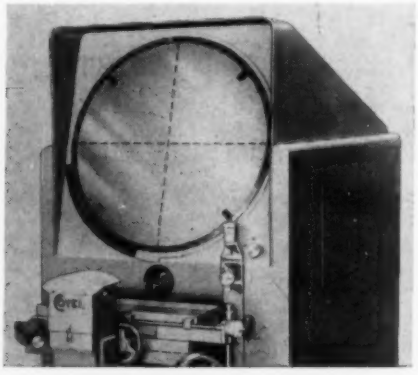
MACHINE TOOL SHOW

(Continued)

OPTICAL COMPARATOR

Covel Manufacturing Co. 332

Covel's new No. 30 optical comparator has a 30" viewing screen and five standard lenses with magnifications ranging from 10X to 62½X.



The stage uses micrometers of one inch travel for measuring both horizontal and vertical planes, with provision for measuring rods or gage blocks for the balance of the stage travel.

The optical system uses relay lenses so the projection lenses are inside the cabinet and do not project over the table. Optics are arranged for an upright image at all magnifications.

Covel Manufacturing Company, P. O. Box 116, Benton Harbor, Michigan.

Use postpaid card. Circle No. 69

Ex-Cell-O Corporation 946

Ex-Cell-O will present its entire line of contour projectors in six models ranging in screen size from 8" to 30".

Featured in the exhibit will be the Model 14-5 with 14" screen. Versatile, rugged, and accurate to tenths, according to the manufacturer, its "heart" is the optical system designed and manufactured by Eastman Kodak Company.

Ex-Cell-O contour projectors afford the operator a staging area with room to measure large objects. Model 30, also on exhibit, has a staging area that will accept and measure parts up to 12" in diameter.

Also to be shown are a new principle of non-contact tracing, which is the first step in tying in electronics with contour gaging, and a new high-pressure mercury light source available on all 14" and 30" Ex-Cell-O contour projectors.

This contour projector exhibit will be staffed by representatives of Optical Gaging Products, Inc., Rochester, New York, an Ex-Cell-O subsidiary that sells and services the contour projector line.

Ex-Cell-O Corporation, 1200 Oakman Boulevard, Detroit 32, Michigan.

Use postpaid card. Circle No. 70

ROLL GRINDERS

The Sheffield Corporation 201

Designed to grind multiple grooves simultaneously in rod mill rolls up to 60" long x 14" O. D., the Model 181-A Crushtrue® roll grinder will be grinding various configurations in bar mill rolls, holding groove spacing to ±.0002".

On one 10" diameter roll, five grooves of different widths will be ground to a depth of .6875" with depth and width tolerances to ±.003" and side wall taper to 5° ±½° —0°.

These grooves will be ground from the solid in 53/55 Rc chilled iron in six hours, according to the manufacturer, in contrast to the 45 hours required by conventional means. Three grooves are ground simultaneously, and after the part is indexed, the remaining two grooves are ground.

Model 181-A features fully automatic grinding and crushing of the wheel.

The Sheffield Corporation, Subsidiary of Bendix Aviation Corporation, Box 893, Dayton 1, Ohio.

Use postpaid card. Circle No. 71

(Continued on page 48)

Mrs. Florence Smith, operator of the Federal Products Corporation, achieves ultra-precise results with the No. 3 Moore Jig Grinder.

Woman operator at Federal Products maintains 50 millionths accuracy with No. 3 Moore Jig Grinder

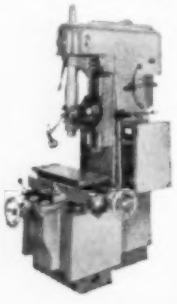
Moore Special Tool Company numbers among its long-time customers the Federal Products Corporation of Providence, Rhode Island—a leading manufacturer of dial indicating, air, electric or electronic gages—special equipment used for measuring, inspecting, sorting or automatic gaging.

The type of work produced by Federal Products calls for highly skilled personnel, not the least talented of which is a woman jig grinder operator, Mrs. Florence Smith.

Mrs. Smith has a *natural* mechanical ability. She is Federal-trained, starting in their plant during World War II. Most of her work is producing masters for precision gages with small holes and slots. Her work is extremely accurate—and she keeps complete records of work performance. She is able to maintain accuracy to within 50 millionths...using the No. 3 Moore Jig Grinder.

Moore machines have been dependable performers in Federal Products Corporation's precision grinding room for a number of years. The company also uses other Moore equipment, such as the Moore Precision Rotary Table and Moore accessories...all of which help Federal meet their customers strictest requirements.

Write today for literature describing all the advantages of the No. 3 Moore Jig Borers and Jig Grinders.



Partner in Precision: No. 3 Moore Jig Borer

This new Moore Jig Borer is unequalled for the speed and accuracy with which it bores, drills, reams and spots holes in dies, jigs and production parts. It breaks the "tenth barrier." It offers more precise positioning tolerances...improved drive ...wider speed range, 60 to 2250 RPM...larger table working surface, 11 x 24".

MOORE SPECIAL TOOL COMPANY, INC.
725 Union Avenue, Bridgeport 7, Conn.

HOLES, CONTOURS AND SURFACES. Tells how to produce tools and dies the modern way. 424 pages, 495 illustrations. $5 in U.S.A. $6 elsewhere.

ADD MOORE TOOLS TO YOUR TOOLROOM

JIG BORERS • JIG GRINDERS • PANTOGRAPH WHEEL DRESSERS • PRECISION ROTARY TABLES • HOLE LOCATION ACCESSORIES

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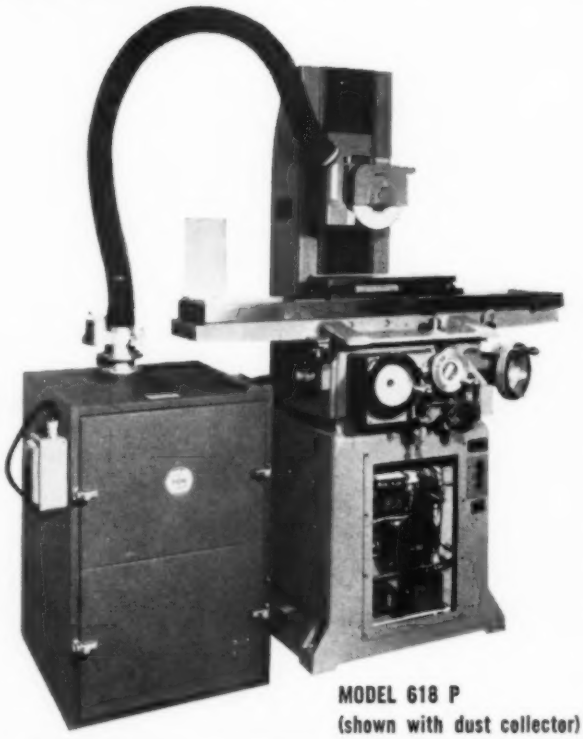
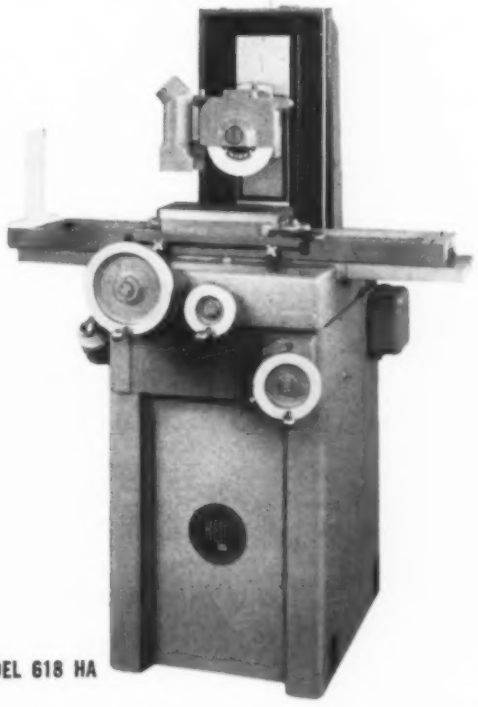
TWO GREAT 618'S BY REID...



MODEL 618 P
(shown with dust collector)



MODEL 618 HA

Industry's first choice for toolroom and production economy!

GREAT BECAUSE: Heavy, rugged construction provides uniformity and vibration-free performance.

7" wide cross slide travel and 20" long table travel provides maximum working surface.

Cross Slide Locks and Hard Chrome Plated Cross Feed and Elevating Screws are standard equipment.

The *REID 618P* features a power table and cross feed . . . automatic lubrication . . . accessible convenient controls.

The New *REID 618HA*, a hand operated model, provides extra high 15¼" working height under a 7" wheel . . . one shot lubrication . . . heavy one-piece cast iron base.

Leading tool rooms and production departments insist on REID . . . tops in industry for 60 years.

See these and other models at your local authorized REID distributors.
Write for FREE catalogs.

PRECISION SURFACE REID GRINDERS

Manufacturers of precision surface grinders for production and toolroom needs

REID PRECISION SURFACE GRINDERS

REID BROTHERS COMPANY, INC. / 133B ELLIOTT ST. / BEVERLY, MASSACHUSETTS

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NOW

G-E Man-Made Industrial Diamonds

Your diamond grinding wheel jobs can be done better with G-E Man-Made diamonds!

Are you benefiting by the proved superiority of G-E Man-Made diamonds in your diamond grinding operations? Fast mounting user acceptance testifies to this superiority. Know why they give more output per wheel . . . why so many shops have standardized on G-E Man-Made diamonds. Your own tests will convince you that wheels containing G-E Man-Made diamonds give superior performance.

Your grinding wheel supplier is the man to call for wheels made with G-E Man-Made diamonds.

Metallurgical Products Department of General Electric Company, 11175 E. 8 Mile Blvd., Detroit 32, Michigan.

METALLURGICAL PRODUCTS DEPARTMENT

GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS • MAGNETIC MATERIALS • THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

Latest G-E Development — Man-Made Diamonds for METAL-BOND WHEELS

Now, there are General Electric Man-Made diamonds for metal-bond wheels, too! G-E has perfected an entirely different, tougher crystal with rough surface characteristics and controlled friability, specifically for metal-bond grinding applications. This new type is MBG. This material has shown outstanding results in electrolytic grinding, in the grinding of sapphire, slicing and dicing of germanium, cutting coarse grained alumina, and carbide. Your own tests will illustrate the advantages of these new diamonds in your own metal-bond grinding.

ds for All 3 Grinding-Wheel Bonds!

Optimized Crystals for Grinding in Both RESINOID & VITRIFIED BOND

With optimized friability, G-E Man-Made type RVG diamonds cover the full scope of resinoid and vitrified bond grinding. Grinding wheels with G-E industrial diamonds last longer because the rough surfaces and optimized friability of the crystal keep it in the wheel longer. Cutting is freer. The result: dramatic reduction in grinding cost per piece and greater output per wheel.

Use postpaid card. Circle No. 243

WHY MICROHONING* of Accumulator Bores provides processing short cut

American Bosch Division of American Bosch Arma Corporation has recently added hydraulic cranking systems and a wide variety of hydraulic accumulators to their extensive line of precision equipment. Microhoning is specified as the only machining operation performed in the bores of the accumulator housings—here is why.

This horizontal Hydrohoner has a hydraulically reciprocated carriage, a ten-foot stroke and a four-speed transmission.

PROCESSING ECONOMY

The accumulator housings are made from mill stock tubing that is mostly either cold rolled welded or cold drawn seamless steel (some of the 4.750″ I.D. tubing is aluminum alloy). Economical processing of tube bores is realized through the inherent efficiency of Microhoning in generating geometry, size and surface finish. Microhoning is the only machining done on bores ranging in diameter from 3.000″ to 6.180″ and in lengths from 6.375″ to 123″.

RAPID STOCK REMOVAL

Accumulator bores are rough—and finished—Microhoned on the horizontal Hydrohoner shown. It is designed to provide rapid stock removal and generate accuracy in long bores. Rough-Microhoning of the mill stock tubing bores removes up to .040″ of stock at a rate of better than .001″ per minute. Finish-Microhoning removes .004″ of stock while generating final accuracies and specified surface finishes.

FUNCTIONAL BORES

In addition to consistent bores that are well within specified size and geometry tolerances, Microhoning provides controlled surface finishes of 7-8 microinches, rms. The Microhoned surfaces are so consistent that a check on a precision surface analyzer is made only two or three times per eight-hour shift. Microhoned bores assure smoother operation and longer life for piston seals in assembled accumulators.

**Registered U. S. Pat. Off.*

Visit Us In Booth 1225 — The Machine Tool Exposition

MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

Use postpaid card. Circle No. 244

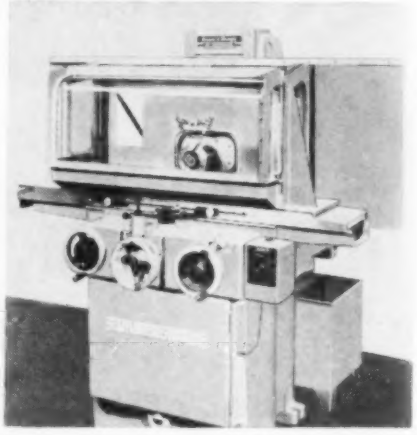
MACHINE TOOL SHOW
(Continued)

SLICING AND DICING MACHINE

Brown & Sharpe Mfg. Co. 452

A new Brown & Sharpe No. 618 Micromaster slicing and dicing machine slices semiconductor materials such as germanium, silicon, and quartz crystals with parallel accuracy to 0.0001″, with consistent repetition in size to ±0.0002″.

The machine cuts clean, burn-free wafers using a metal bonded or resinoid bonded diamond wheel.



The table driving mechanism provides smooth feed, infinitely adjustable from 0.100″ to 144″ per minute, with rapid table positioning adjustable to approximately 25 fpm.

Brown & Sharpe Manufacturing Company, Promenade Street, Providence 1, Rhode Island.

Use postpaid card. Circle No. 72

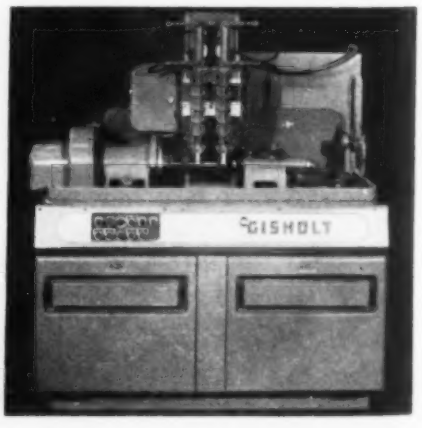
SUPER FINISHING EQUIPMENT

Gisholt Machine Company 1042

Two Superfinishing machines and two attachments will be shown by Gisholt Machine Company.

The Masterline Model 51-B general purpose Superfinisher will be shown for the first time.

Specifically designed for processing parts not requiring longitudinal traverse, Model 51-B consists of a simple bed on which are mounted a headstock, a tailstock, and a vertical platen.



The platen has a self-contained reciprocating unit on which can be mounted one- or two-stone carrying quills. A second platen can be added at any time, permitting simultaneous finishing of one to four diameters during an automatic cycle. Model 51-B can be equipped with automatic size control.

A Gisholt Masterline Model 81 single spindle Superfinisher will also be on exhibit.

Two sizes of Gisholt Masterline Superfinishing attachments will be shown. These are designed for mounting on grinders or lathes for occasional jobs.

Gisholt Machine Company, 1245 East Washington Avenue, Madison 10, Wis.

Use postpaid card. Circle No. 73

Taft-Peirce Mfg. Co. 1426

Two "Microstoning" machine tools, first of their kind built in this country, will highlight the Taft-Peirce Manufacturing Company exhibit. The machines are designed to give the finest, most accurate finish and roundness correction possible on a production line basis, according to the manufacturer.

The machines incorporate the principles of the Supfina "Microstoning" attachments introduced by Taft-Peirce last year.

One is a Plunge Cut machine with automatic cycling, on which outside work surfaces up to two inches long by ⅛" to 1⅛" diameter can be finished to a low microinch reading, and out-of-roundness improved 75% or better. The other is a throughfeed model which passes pieces to be surfaced under a series of abrading stones to correct out-of-roundness and to reduce rough surfaces to precision smoothness, automatically.

Taft-Peirce Mfg. Co., 32 Mechanic Ave., Woonsocket, Rhode Island.

Use postpaid card. Circle No. 74

(Continued, page 52)

HOW MICROHONING of Accumulator Bores provides processing short cut

Fast, economical generating of specified bore size, geometry and surface finish in accumulator housings is required by American Bosch Division of American Bosch Arma Corporation. Housings are made from mill stock tubing and Microhoning is specified as the most suitable process to consistently and quickly generate precision bores. Here is how a horizontal Hydrohoner provides a processing short cut.

The flange-type tool used to Microhone the 6.180" I.D. tubing has 8" long stones and four fibre guides. These stationary guides pilot the tool into the bore and prevent "collapsed" abrasives from marking precision bore surfaces when withdrawing the tool.

SIMPLIFIED PROCESSING

Because Microhoning characteristics include: rapid stock removal; consistent machining to specified size; correction of geometric irregularities; and generation of microinch finishes, there is no need for any other machining operation. Rough-Microhoning of the bores removes up to .040" stock at a rate better than .001" per minute. Then the finish-Microhoning operation quickly generates final size, geometry and surface finish. Thus, processing is simple, quick and economical.

AUTOMATIC GAGING

Gage Air Microsize is used to automatically terminate the Microhoning cycle as each bore reaches specified size. Microsize controls are interlocked with Hydrohoner controls, and the reciprocating gage spindle is synchronized with the tool spindle. Therefore, at each withdraw stroke of the tool, the gage spindle attempts to enter the bore. When it enters the bore, the air back-pressure is increased and at a predetermined back-pressure the Hydrohoner is automatically stopped.

HIGH EFFICIENCY

Another factor contributing to the high efficiency of this Microhoning set-up is the electric rotary feed tool. This design provides constant feed speed and maximum cutting action. Also, with rapid expansion and "collapse" of abrasives, it assures shorter cycle time than obtainable with conventional hydraulic feed mechanisms.

Visit Us In Booth 1225 — The Machine Tool Exposition

PRECISION PRODUCTION THROUGH MICROMATIC

MICROMATIC HONE CORP.

8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN

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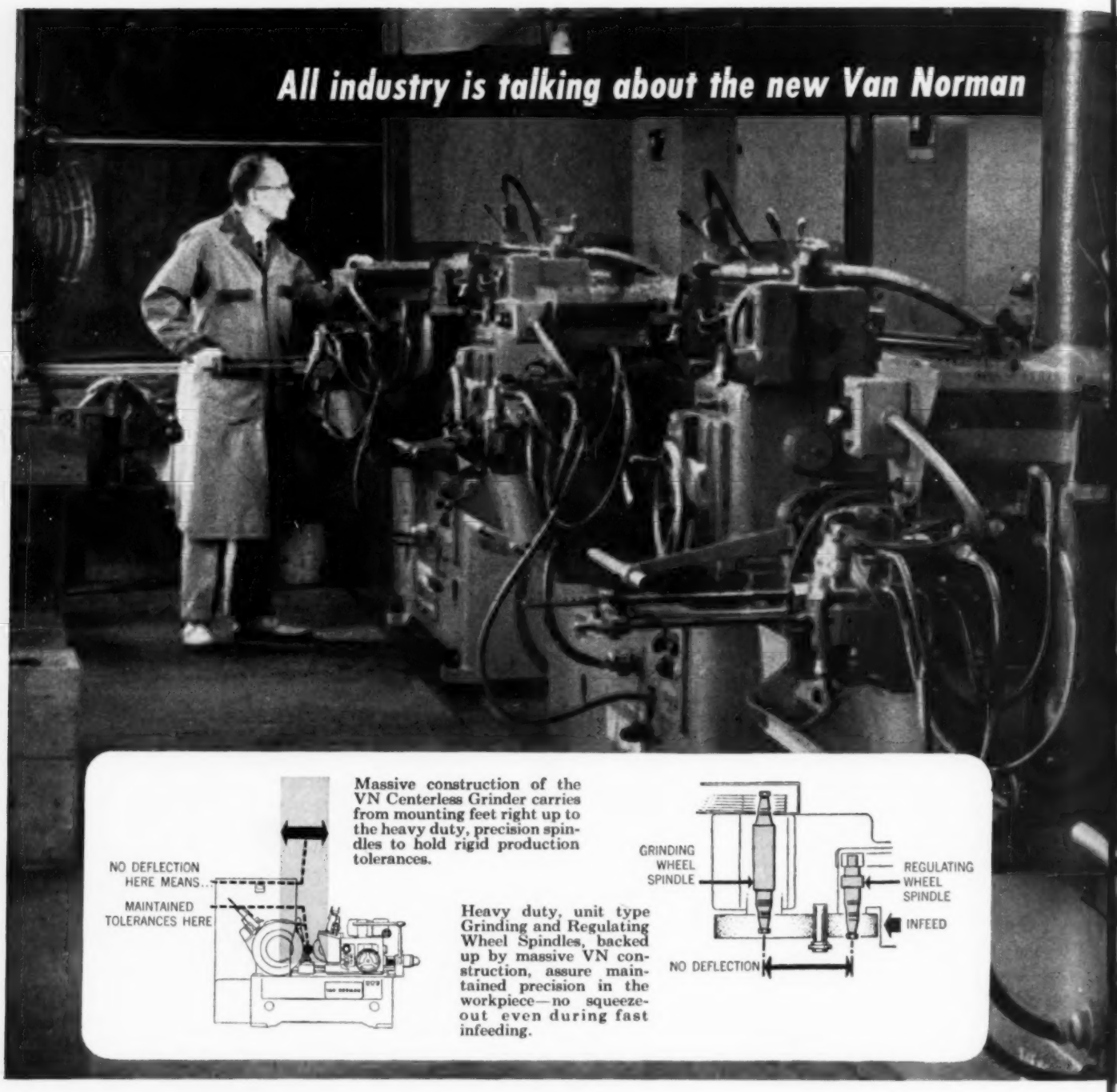


Massive construction of the VN Centerless Grinder carries from mounting feet right up to the heavy duty, precision spindles to hold rigid production tolerances.

Heavy duty, unit type Grinding and Regulating Wheel Spindles, backed up by massive VN construction, assure maintained precision in the workpiece—no squeeze-out even during fast infeeding.

NEW VAN NORMAN GRINDER TRIPLES

VN 2C Centerless Grinders turn out famous cutting tools with spectacular speed,

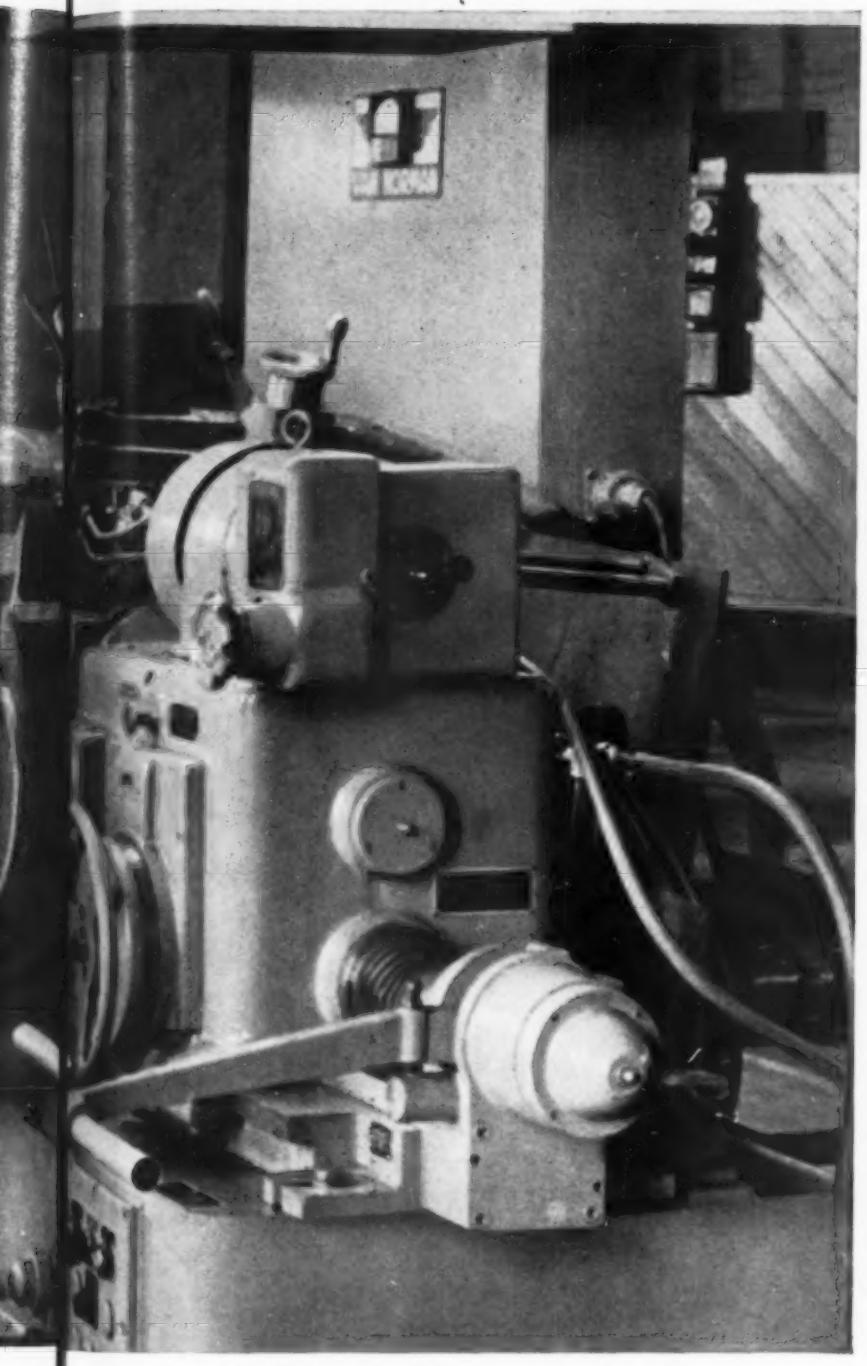
Production rates at Morse Twist Drill and Machine Co., in New Bedford, Mass., boomed when new Van Norman 2C Centerless Grinders were put to work. One of these rugged, heavy-duty machines actually combines the output of *three* centerless grinders! What's more—one man at Morse can set up and operate three VN 2C's *simultaneously* to turn out 5,000 precision-ground drills an hour. Previous box score: one man; one machine; only 800 drills an hour.

300% Faster Output To Close Tolerances—Work speed is hand-wheel regulated, gives an infinite RPM range to regulating wheel drive. The grinding wheel—large 24 x 8 x 12 inches—is profile diamond dressed, and increases machine efficiency by producing more pieces per dressing. Special tooling provides automatic operation for grinding with hopper feeding, and a unique unloading method. Traditional Morse quality is maintained by holding tolerances of 0.00025.

VAN NORMAN

SPRINGFIELD 7, MASSACHUSETTS

2381



PRODUCTION AT MORSE

versatility, precision, economy

On Any Job, More Work Per Operator Per Work Shift — with the fast, versatile, accurate, cost-cutting VN 2C Centerless Grinder. Thru-feed or infeed. Capacity 0" to 4¾" diameter. Van Norman unit-type, anti-friction bearing spindles on both grinding and regulating wheels. Optional: VN Crush Dressing Attachment.

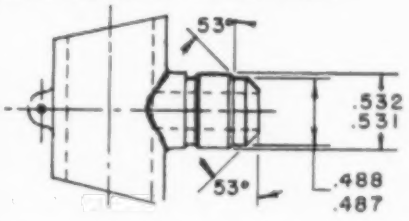
Free Booklet—"Centerless Grinding"—valuable guide to high production, lower costs. For your copy, contact factory or your local distributor.

MACHINE COMPANY

A DIVISION OF VAN NORMAN INDUSTRIES, INCORPORATED

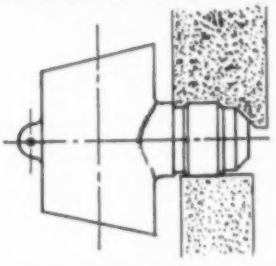
Another typical Van Norman centerless grinder cost-saving application

CUSTOMER'S PROBLEM:



To produce parts to print at lowest possible cost. Van Norman was asked to suggest method of grinding .487/.488 diameter, .531/.532 thread diameter and 53° seal angle. These dimensions had previously been turned on screw machine without good results. Particularly the 53° angles which required that a 90% blue must be had when checked in a master gauge. Chatter and runout were the two major problems by the previous method.

VAN NORMAN SOLUTION:



Using a VAN NORMAN Centerless Grinder, the part was ground. The part was first rough turned and formed to a straight diameter of approximately .535 and a 53° angle. Then, by using a VN Crush Forming Attachment, the wheel was formed to the desired shape, using a straight regulating wheel for support, plus a hold down to keep the part from tipping off the blade. The part was ground in one operation to desired size and finish.

THE RESULT:

Operation was entirely successful. Several VN machines are now in operation on this job. Reports show the customer is producing parts at the rate of 240 pieces per hour at 100% efficiency, and are grinding up to 1500 parts per wheel dress. This is another typical cost-saving advantage of Van Norman Crush Forming.

Use postpaid card. Circle No. 247

MACHINE TOOL SHOW

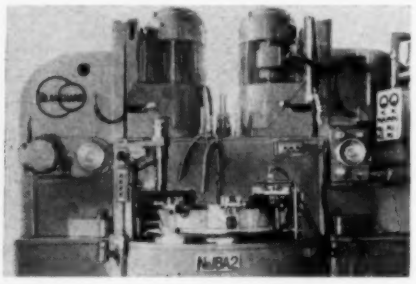
(Continued)

SURFACE GRINDERS

The Blanchard Machine Company 1209

Two entirely new Blanchard surface grinders, designated as No. 18-A2 and No. 27-48, will be shown for the first time.

The No. 18-A2 grinder is a new two-spindle automatic surface grinder. This new machine is of "dry base" design; in operation all coolant and chips flow out of the grinder to an outside settling tank or central coolant system.

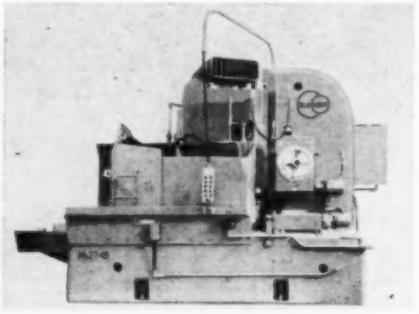


Push button stations and operation's controls are conveniently located. All controls are interlocked for complete safety. A warning light flashes at the operator's station when grinding wheels need replacement.

The grinder is equipped with 30 hp foot-type spindle motors.

The machine on display at the Exposition will have an eight-station fixture, each station handling a different work piece, to demonstrate the ingenuity of Blanchard fixture design.

The No. 27-48 grinder is an entirely new size. This machine has a 48" diameter magnetic chuck with a clearance of 52" inside of the waterguards, 12" vertical range, a 27" segment grinding wheel, and a 75 hp main spindle motor.



Coolant is directed to both the inside and the outside of the grinding wheel.

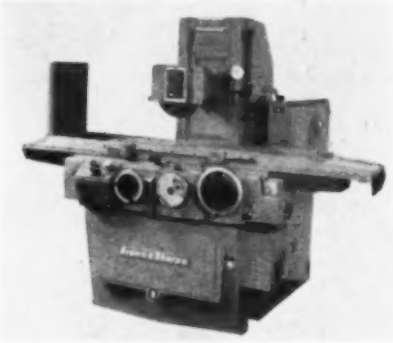
According to the manufacturer, these features provide ample power, rigidity and coolant flow for heavy stock removal on a large variety of work pieces; great accuracy; and, with proper wheel selection, extreme flatness and fine finish.

The Blanchard Machine Co., 64 State Street, Cambridge 39, Massachusetts.

Use postpaid card. Circle No. 75

Brown & Sharpe Mfg. Co. 452

Prominent in the Brown & Sharpe booth will be two newly designed and larger surface grinding machines. These new 8" x 24" and 10" x 30" sizes, added to the smaller 5" x 10" and 6" x 18" sizes announced during the last two years, make the entire line of surface grinding machines new since the 1953 Machine Tool Show.



Vertical capacity has been increased to 14" with a transverse movement of 14" on the 8" x 24" machine. This new design can be furnished with a 2 or 3 hp "Oriflex" drive to the spindle, or with a 5 hp direct drive spindle.

Brown & Sharpe Manufacturing Company, Promenade Street, Providence 1, Rhode Island.

Use postpaid card. Circle No. 76

(Continued on page 54)

WANT SAVINGS?

One user reports that one Vibraslide finisher does the work of four large conventional tumblers.

AND QUALITY?

Another says: "Until we installed Vibraslide equipment, the finish we are now getting was impossible. Neither conventional tumbling nor non-rotating vibrators could get it for us."

ELLIOTT VIBRASLIDE FINISHER

WORTH INVESTIGATING!

For Deburring, Radius Forming, Fine Surface Finishing

Distributed by

Call or Write for Demonstration

mf Equipment co.

410-G Frelinghuysen Avenue, Newark, N.J. Bigelow 2-6211

The Vibraslide Finisher in 5, 10 and 20 cu. ft. capacities combines vibration with rotation to reduce time cycles, eliminate hand operations, handle more parts. And the new compact-size, tub-type vibrafinisher in 1, 5 and 10 cu. ft. capacities achieves rapid finishing without impingement damage. Look 'em over!

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steel bars, tubes, angles, etc. . . . cast iron, bronze, brass

cut them fast and cut your costs with SIMONDS CUT-OFF WHEELS

For cutting metals *and* costs, use these abrasive wheels. They are just about the quickest, most efficient way to cut all kinds of metal and non-metals, and, since Simonds makes them in all grain, grade and bond combinations, you are sure of getting the ones exactly suited to *your* needs.

Regular Resinoid bonded for the rigors of high speed operation. Borolon (aluminum oxide abrasive) for steel bars, tubes, angles, etc. Electrolon (silicon carbide) for cast iron, bronze, brass and non-metals.

Reinforced Resinoid bonded for added strength. Hot pressed "BFN" type for foundry work . . . Double XX type, glass fiber reinforced on both sides, for cutting all metals and non-metals (except wood), including masonry blades.

Regular Rubber bonded for wet or dry grinding. Ideal for cutting all materials under stress and strain. Because of their clean-cutting action, finishing operations can be eliminated.

Reinforced Rubber bonded for extra safety. For swing-frame cutting on gates, risers, etc. Available wtih (1) Standard Reinforcement; fiber glass on both sides (2) Double Reinforcement; reinforced internally in addition to both sides, or (3) Triple Reinforcement; two internal reinforcements in addition to both sides.

Write for informative bulletins.

SIMONDS ABRASIVE CO.
Tacony & Fraley Sts.
PHILADELPHIA 37, PENNA.
Division of Simonds Saw and Steel Co.
COUNT ON / YOUR SIMONDS DISTRIBUTOR
FAST SERVICE • LOCAL STOCKS

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SHREVEPORT — IN CANADA: GRINDING WHEELS DIVISION, SIMONDS CANADA SAW CO., LTD., BROCKVILLE, ONTARIO • ABRASIVE PLANT, ARVIDA, QUEBEC

Use postpaid card. Circle No. 249

MACHINE TOOL SHOW

(Continued)

Covel Manufacturing Co. 332

The No. 10P power assisted hand feed 6" x 18" surface grinder has been designed, according to the manufacturer, to retain the advantages of quick setting for short run jobs.

The design (patent applied for) uses hydraulic power with finger-tip control similar to that used for power steering in automobiles.

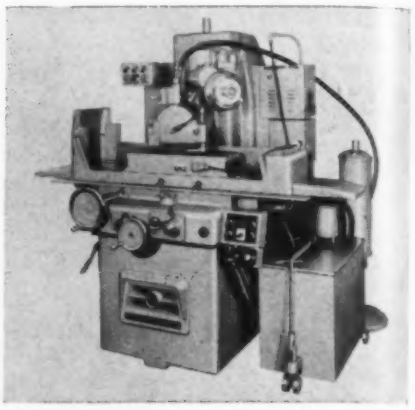
Grinding time is reduced, it is said, over straight hand fed machines because handling time remains the same and grinding speed is consistently almost twice the rate obtained by hand.

Covel Manufacturing Company, P. O. Box 116, Benton Harbor, Michigan.

Use postpaid card. Circle No. 77

Gallmeyer & Livingston Company 751

Four "Grand Rapids" surface grinders highlight the Gallmeyer & Livingston exhibit.



Model No. 350, pictured above, is a hydraulic feed surface grinder equipped with incrematic down feed, as is Model No. 560.

Model 350 has a capacity of 8" x 13" x 24", wheel size 10" x 1" x 3", and table speeds of 3" to 120' per minute.

Model 560 is a precision tool room type hydraulic feed surface grinder, with a 14" x 36" working surface on the table. It uses a 14" x 1½" x 5" wheel.

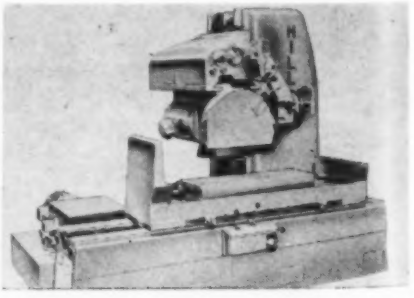
Also in the display are a Model 206, with a table working surface 6" x 18", and a Model A production type surface grinder, available in sizes from 12" x 18" x 36" to 16" x 18" x 72".

Gallmeyer & Livingston Company, 336 Straight Avenue, S. W., Grand Rapids 2, Michigan.

Use postpaid card. Circle No. 78

The Hill Acme Company 1240

A new 12" x 42" Hill horizontal spindle grinder for grinding hardened steel shear blades will be exhibited under power. The product will be metal cutting shear blades made of high alloy tool steel, Rockwell 55, to be ground to within tolerances of .0002" for thickness and width.

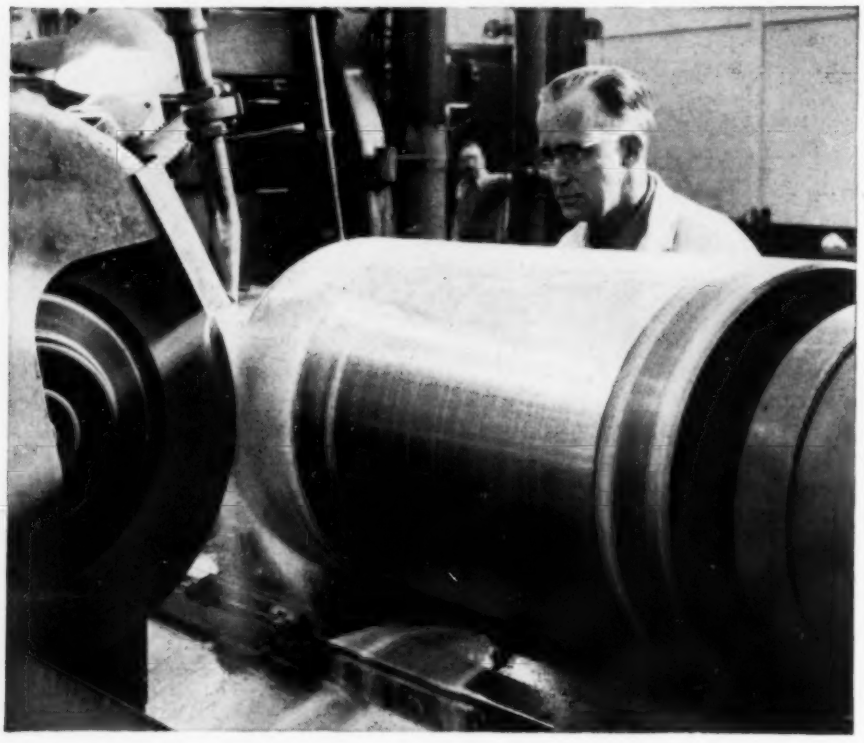


The Hill Acme Company, 1201 West 65th Street, Cleveland 2, Ohio.

Use postpaid card. Circle No. 79

(Continued on page 58)

Where the wheel meets the steel . .



"Jobs change—but coolant doesn't with W&B E-55 in this Norton Grinder!"

"We can never tell what tough job is coming up next in this cylindrical grinder," says Mr. Ellis E. Carlson, Jr., General Foreman of Norton Company's Central Service Department. "It may be stainless (like the job shown here) or any number of nonferrous metals, alloys or steels.

"We do know that, no matter what the metal, W&B Grinding Coolant E-55 will do the job! It gives us good cooling; keeps the wheel clean and free cutting. And we don't have to clean the tank as often.

"On top of that, E-55 doesn't foam; settles chips fast; and gives good rust protection. It makes a clean, transparent coolant that doesn't smell bad and is easy on the hands." What more could you ask?

Send for a FREE working sample of W&B E-55! Write coolant tank size, plus make and type of grinder and typical jobs . . . on company letterhead. Mail to The White & Bagley Co., 88 Foster Street, Worcester, Mass.

W+B INDUSTRIAL LUBRICANTS

THE WHITE & BAGLEY CO.

Worcester, Massachusetts • Detroit, Michigan

Originators of Grinding Lubricants

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EXOLON ABRASIVE CHIPS + Vibratron = Finishing

THE PROFITABLE WAY TO FINISH METALS

Coruloy A

VIBRATRON Finishing Machine
Manufactured by Roto-Finish Co.

Finish Forged Shears. Time cut from 20 hrs. to 6 hrs. Hand work eliminated. No distortion of parts.

Deburr and Polish steel caster horns. Time reduced from 6 hrs. with 2 compounds to 1½ hrs. with 1 compound.

Deburr Aluminum Rotor Fan. Previous method hand deburring. VIBRATRON Process, 10 parts per hour. No hand work required. Greatly improved surface.

ONLY THE BEST IN ABRASIVES IS GOOD ENOUGH FOR VIBRATRON, THE BEST IN MASS PRODUCTION FINISHING

The Vibratron increases production of cast, forged, stamped and machined parts up to 100%. It cleans, descales, deburrs, forms radii, fine finishes and colors. Equally important . . . parts with hard-to-reach shielded and internal surfaces can be effectively finished. The Vibratron produces finishes quickly, because the induced vibration produces abrasive action throughout the entire mass and works on all surfaces — internal and external — of the parts being processed. EXOLON abrasive shapes of strong, dense, rugged aluminum oxide fused in the electric furnace contribute to the success and high production of this fast finishing Vibratron process. Write for complete information.

The EXOLON Company
1002 E. NIAGARA ST. TONAWANDA, N. Y.

anufacturers of SILICON CARBIDE *and* ALUMINUM OXIDE ABRASIVES

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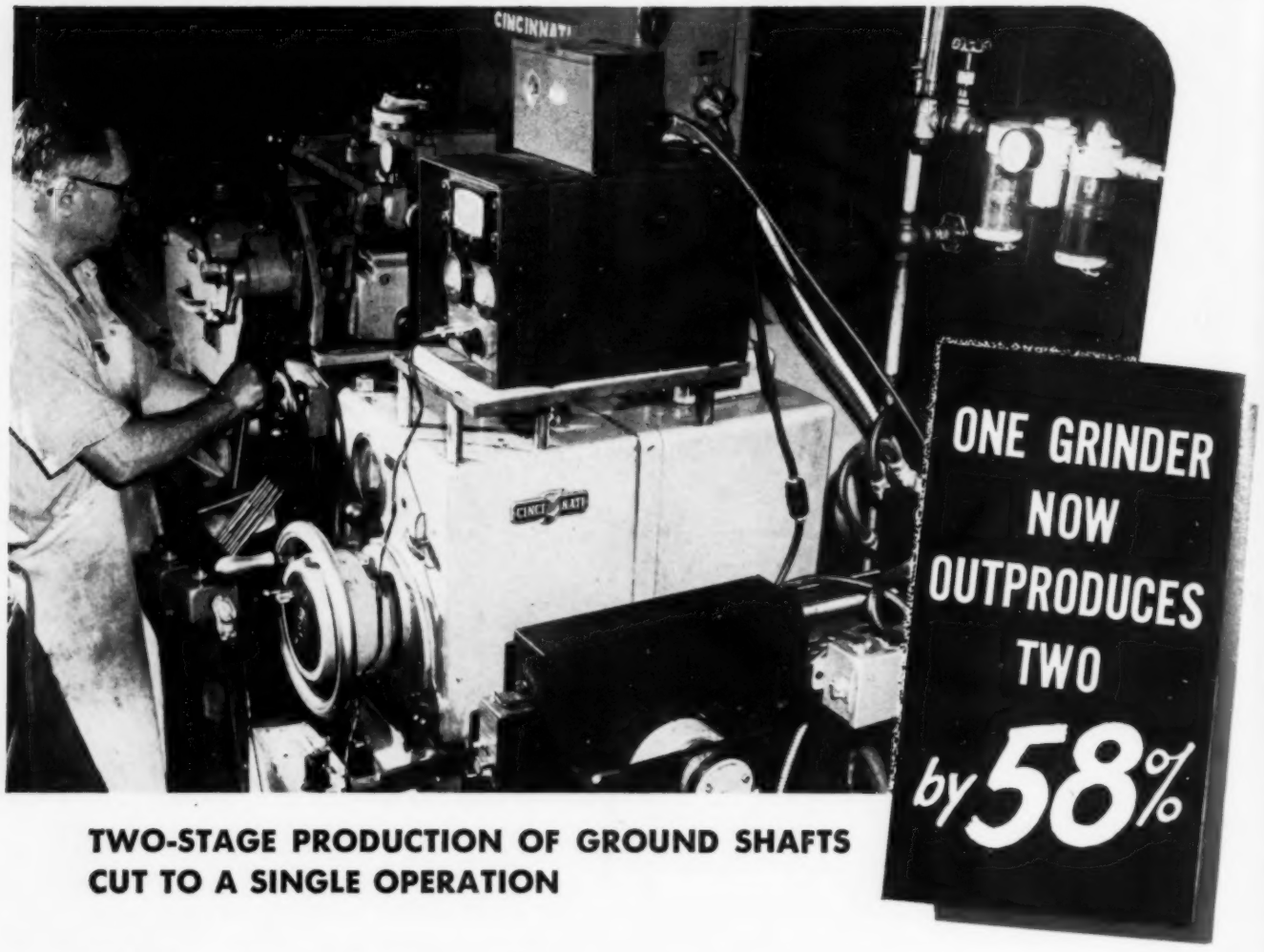
With a BEL-AIR® POWER FEED...



TWO-STAGE PRODUCTION OF GROUND SHAFTS CUT TO A SINGLE OPERATION

At the Cleveland, Ohio, plant of General Electric Company's Vacuum Cleaner Department, grinding four steps and a taper on a 6" shaft was formerly a two-stage operation, with two centerless grinders producing 713 pieces in an eight-hour period.

Today a single grinder — equipped with a Bel-Air Power Feed — produces 1128 pieces in a single operation. What's more, rehandling of workpieces between operations has been eliminated, and the consistently closer tolerances have allowed statistical sampling to replace the gauging of each finished shaft.

This experience is typical of those reported by users of the Bel-Air Power Feed, a unit consisting essentially of a special Bellows Power Feed linked to a modified MICROtrol Unit manufactured by Airborne Instruments Laboratory division of Cutler-Hammer, Inc. Designed primarily for use with a Cincinnati #2 Centerless Grinder in applications for infeeding parts which are not ground over their entire length (headed pins, rounds or pins of divided diameters, etc.), the Bel-Air Power Feed offers the user a unique combination of advantages, including:

- **Work held to .0002" in production quantities . . . to .000070" on parts smaller than ½".**
- **Pre-determined finished size obtained through constant monitoring by electronic unit.**
- **Pre-grinding is eliminated — variations in sizes of workpieces do not affect finished size.**
- **One knob adjusts for size during operation.**
- **Compensation can be made for wheel wear, variations in machine elements and operating conditions without shutting down.**
- **Can be set for both coarse and fine feeds.**
- **Can be set for either continuous cycling or single cycle operation.**

IT COSTS YOU NOTHING TO INVESTIGATE

Find out how you can cut your grinding costs with the Bel-Air Power Feed. Write today for complete information — no cost or obligation, of course. Address Dept. GF-960, Bellows-Valvair, Akron 9, Ohio.

850-C

Bellows-Valvair

Bellows-Valvair

The Bellows Co. • Valvair Corp. Akron 9, Ohio

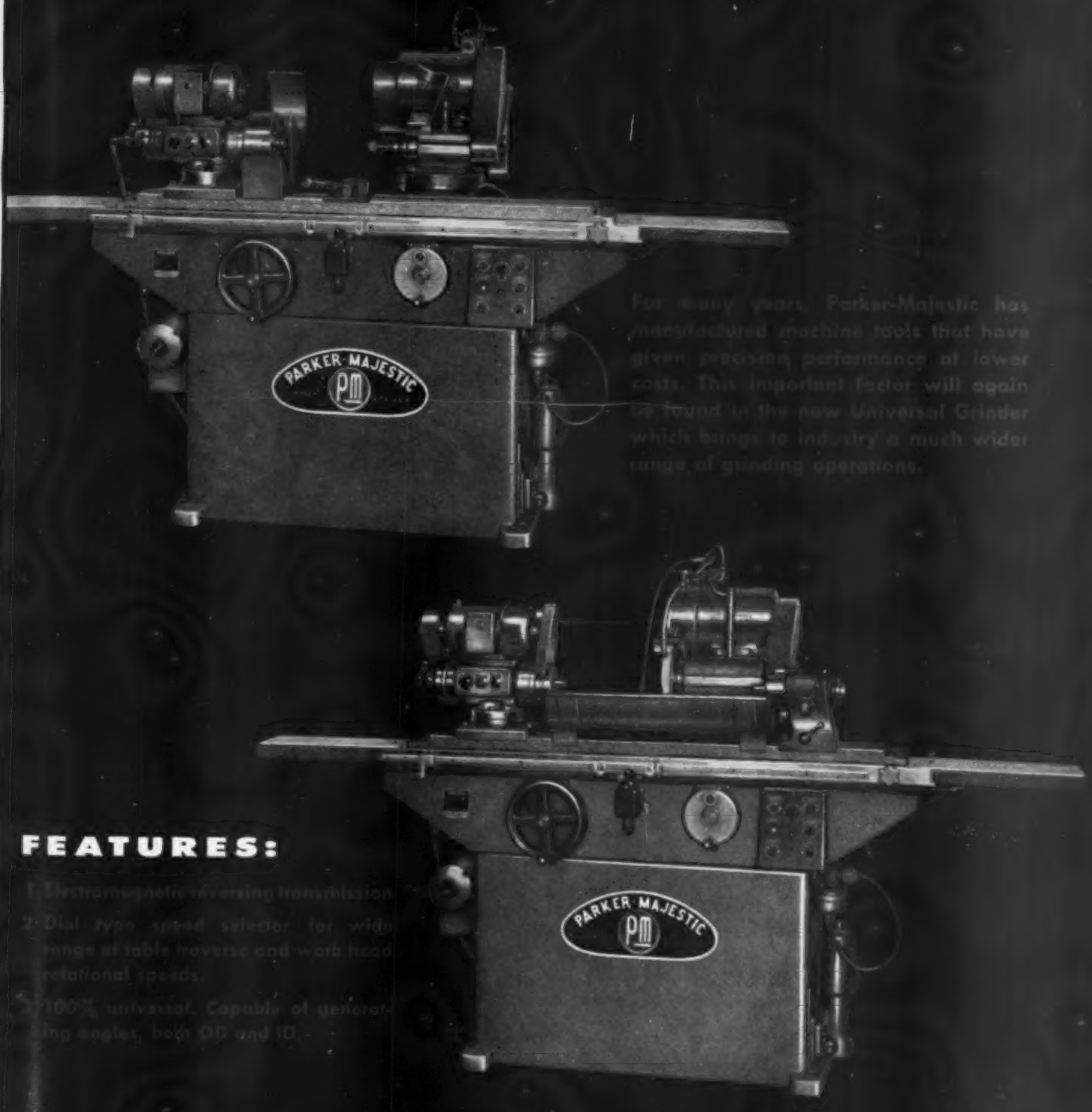
DIVISIONS OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)

Use postpaid card. Circle No. 252

• GREATER IN PERFORMANCE
• LOWER IN COST

THE NEW *Parker Majestic*

No. 2 UNIVERSAL GRINDER



For many years, Parker-Majestic has manufactured machine tools that have given precision performance at lower costs. This important factor will again be found in the new Universal Grinder which brings to industry a much wider range of grinding operations.

FEATURES:

1. Electromagnetic reversing transmission.
2. Dial type speed selector for wide range of table traverse and work head rotational speeds.
3. 100% universal. Capable of generating angles, both OD and ID.

PARKER • MAJESTIC PM PRECISION MACHINES

PARKER MAJESTIC, INC. DETROIT 7, MICHIGAN

MACHINE TOOL SHOW

(Continued)

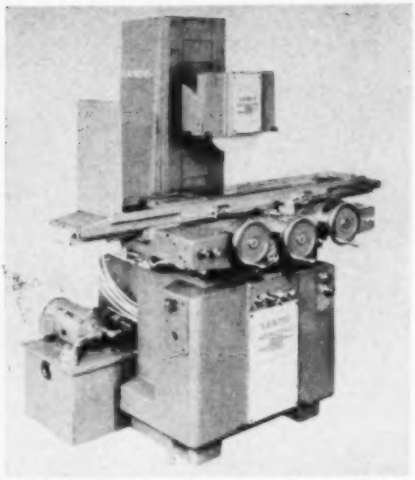
Landis Tool Company 823, 825

Four surface grinders will demonstrate major improvements, to meet industry's needs for equipment to produce finer work at higher rates of speed, according to Landis Tool Company.

A new hydraulically-operated Landis Abrasive 618 (illustrated) will be shown for the first time. A Landis Hydrabrasive 1224 precision surface grinder will demonstrate the use of automatic increment downfeed for grinding a variety of parts.

A second Landis Hydrabrasive 1224 equipped with unique tooling will demonstrate a difficult groove grinding operation on special twister guides for the production of steel rod.

A redesigned Landis Abrasive 1½



hand operated precision surface grinder for tool and die shop, tool room, and job shop will also be exhibited.

Landis Tool Company, East Sixth Street, Waynesboro, Pennsylvania.

Use postpaid card. Circle No. 80

Norton Company 651

Norton Company is featuring four surface grinders, the new 10" x 16" and 6" x 12" Type TS hand surface grinders, and the recently-announced Type S-3 6" x 18" and 8" x 24" hydraulics.

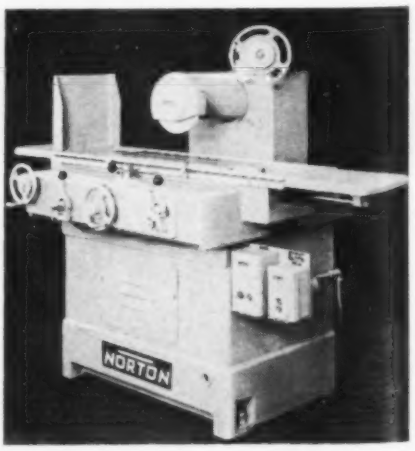
Except for size differences, the two hand-operated machines offer essentially the same features.

Precise two speed vertical feed calibrated to .0001" is an important design feature in the hand surface grinder. These machines are designed to mount a 7" and a 12" grinding wheel respectively. The larger model has provisions for changing wheel speed as the wheel wears or when a smaller wheel is used to grind a larger piece of work. Parts as high as 12" may be ground on either model using the standard sized wheel.

The sliding table and the saddle ways both move on antifriction bearing rollers. This provides easy motion with precision control. For truing, a sliding table lock is provided. For shoulder and groove grinding, a saddle motion lock is provided. Both locks can be used as adjustable drag controls should operators prefer them for certain operations.

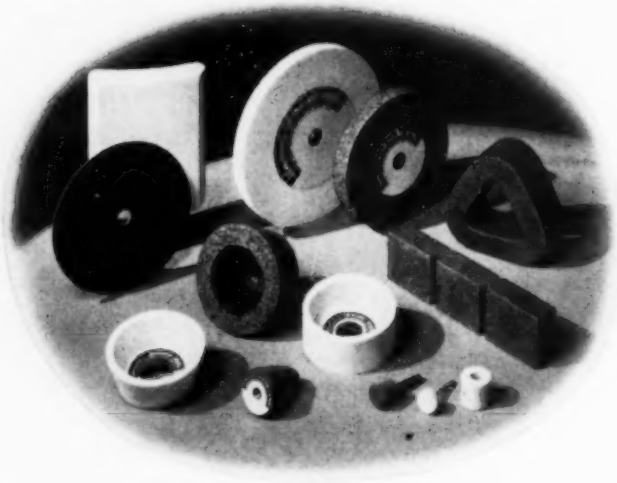
Slip rings on the vertical and cross-feed handwheels are available and will be shown on the 10 x 16" Type TS. These permit the operator to adjust the slip ring to the zero mark to avoid possible subtraction errors in calculating stock to be removed.

The completely new Type S-3 hydraulic surface grinders (below) are said



(Continued on page 60)

For three score years and more...



. . . cost conscious buyers of production grinding wheels have been specifying "American" on their purchase orders knowing they would get wheels of uniform quality and performance . . . wheels that had been individually engineered to do their particular job more economically and efficiently . . . wheels that were exactly the same every time they were ordered regardless of shape — size — structure or quantity.

"American" offers wheels in every size and shape and for every purpose for which a grinding wheel is used. Every wheel is tested for true running qualities, strength and balance. Exact duplication is assured through the use of the most modern electronic and mechanical testing devices.

And "American" gives you a personal service by trained men . . . men who have dedicated themselves to the satisfactory solving of any and all production problems where grinding wheels are used.

There is an "American" man near you — call him or write for illustrated brochure to

"American" EMERY WHEEL WORKS

5 RED BRIDGE, PROVIDENCE 1, RHODE ISLAND

Use postpaid card. Circle No. 254

the GOLDEN OPPORTUNITY

a bonanza for every user of DIAMOND WHEELS

A.I.T. Strikes Gold with The New

Podner—this h'yar wheel looks jist like this

49'er

RESIN BONDED DIAMOND WHEEL

A wheel with all the ruggedness and persistance of the original 49'ers. Works cooler under all conditions, wet or dry. Provides a sure strike throughout its long life. In 50, 75 and 100 concentration. NEW! Now packed in transparent box . . . see type and specifications at a glance.

Multiply your savings—a "sure strike on all claims"—join the 1960 GOLD RUSH with the 49'er NOW!

Ask for information on A.I.T. Resin and Al-Aloid (Metal Bonded) Diamond Wheels in man-made or mined Diamonds for conventional and electrolytic grinding.

Dealers! Write for details.

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A.I.T. Diamond Tool co.

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MACHINE TOOL SHOW

(Continued)

to have faster table speed (up to 150 feet per minute) than any comparable machines available. The larger model has been available only since April of this year. The smaller model was announced about a year and a half ago. The maximum table speed of the 6" model has been raised to 150 feet per minute from the 125 feet per minute originally available. Minimum rate is 3 inches per minute.

Faster table speed has two distinct advantages with no apparent disadvantages. The first is the obvious increase in production rate. Grinding time has been reduced as much as 50% over older Norton surface grinders shown at the last Machine Tool Exposition. The second advantage is marked decrease in heat damage to the work. Because of the increased table speeds available, the heat generated in grinding is removed faster. The heat is caught in the grinding chips resulting in less penetration of the heat into the work itself.

The 6" model will grind work up to 15" in height with a standard 8" wheel. The 8" model will grind work up to 13¾" under a 10" wheel or 15¼" under a 7" wheel.

Norton Company, 1 New Bond Street, Worcester 6, Massachusetts.

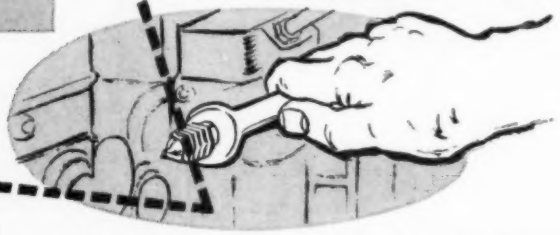
Use postpaid card. Circle No. 81

STASET TURN-A-TOOL

(PATENT PENDING)

. . . LETS YOU TURN DIAMOND TOOLS WITHOUT DISTURBING SET UP!

Every diamond tool user knows the importance of turning the diamond to keep it sharp. Sharp diamonds mean maximum accuracy and longer tool life. Turn-A-Tool's unique design permits rotation of the *entire tool* within a fixed shank. As a result, the diamond tool can be easily turned while it is securely locked in set up. With Turn-A-Tool there is absolutely no downtime . . . tool may be turned while machine is in operation! Check all the special Turn-A-Tool features listed below . . . features you only get with Staset Turn-A-Tool.



✓ **ADAPTABLE TO ALL STYLES OF DIAMOND TOOLS —** Unlike other manual "diamond turning devices", Staset's design utilizes the entire tool and can be applied to *all diamond tool styles* and a *complete range of diamond weights* in single point, multiple point, or cluster diamond tools.

✓ **ROTATION WITHIN A FIXED SHANK —** Because the entire tool (not just the head) of Turn-A-Tool moves within a fixed shank, you get rugged, trouble-free tool performance.

✓ **NO LOST TENSION —** Turn-A-Tool's absence of wear at the bearing surface results in constant trouble-free tension.

Get the complete story on Turn-A-Tool. Send for Staset's special "Turn-A-Tool Data Sheet" listing complete specification and pricing information.

DIAMOND STA SET TOOLS

THE STASET COMPANY, INC.
West Orange, N. J.
MANUFACTURERS OF PRECISION DIAMOND TOOLS SINCE 1922

THE STASET COMPANY, INC.
66 Franklin Ave., West Orange, N. J.

Please send me
☐ Turn-A-Tool Data Sheet
☐ Staset Catalog 460 ☐ Have representative call

Name _____ Title _____

Address _____

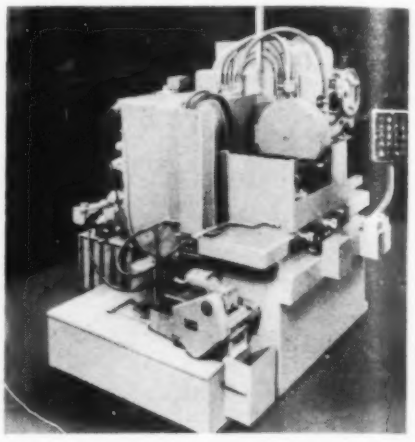
City _____ State _____

Use postpaid card. Circle No. 256

Sundstrand Machine Tool 1014

Sunstrand will feature a new Sundstrand-Arter Model E rotary surface grinder with a horizontal spindle and a reciprocating table on which a rotating magnetic chuck is mounted.

The cast iron spindle head is mounted on the column precision slide. A 15 HP motor drives the wheel spindle through "V" belts, eliminating the mechanical vibrations of a metal to metal contact. Drive belts are located away from the work area and are protected from oil, coolant, and sludge. The spindle head



can be fed manually or automatically by hydraulic power. An automatic grinding cycle with rapid, feed, dwell and return is also provided.

The reciprocating table rides on precision square and "V" ways. Table travel is infinitely variable from 0 to 19 FPM, and length of stroke is controlled by adjustable stops.

Sundstrand Machine Tool, Division of Sundstrand Corporation, Belvidere, Illinois.

Use postpaid card. Circle No. 82

Taft-Peirce Mfg. Co. 1426

Taft-Peirce will have two No. 1 Precision Surface Grinders in the exhibit.

One will be set up to demonstrate precise form grinding. It will be equipped with a Diaform wheel dresser and a variable speed control for the wheel spindle.

Several important refinements have been added to these machines recently, including a new spring-loaded anti-backlash assembly for the crossfeed mechanism, which assures constantly-precise settings; an improved control knob for the vertical feed vernier, and specially-plated handwheels for easier reading. New Plexiglas safety lights, and hinged wheel covers will also be demonstrated.

A six-inch rotary grinder with well-known Taft-Peirce features will also be working at the show.

Taft-Peirce Manufacturing Company, 32 Mechanic Ave., Woonsocket, Rhode Island.

Use postpaid card. Circle No. 83

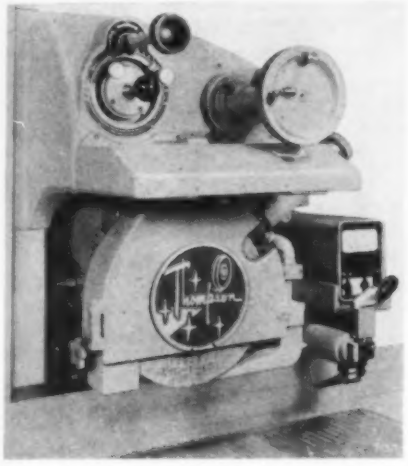
The Thompson Grinder Co. 850

The outstanding feature of the new Super B Thompson grinder (12" x 16" x 30") is the 10 hp in-built wheel head motor on a spindle equipped with the world famous Malcus block bearings. These bearings are preloaded, self-adjusting, cold running, have rotational stability, are vibrationless and free from wear.

Other noteworthy features are:

A dial type cross feed with 14" of stroke. The manual cross feed at the wheel head consists of a precision hardened and ground screw with an antifriction roller unit interlocked with the power cross feed to prevent simultaneous engagement.

The Super B is equipped with the exclusive Thompson Hydra-Cool Hydraulic System with a separate hydraulic sealed oil sump, eliminating any



oil sump in the base. As part of the hydraulic system, patented packless dual table cylinders with cushioned stopping are provided. An automatic system, entirely separate from the hydraulic system, provides complete lubrication for the grinder.

Both the cross slide ways and the ball bearing elevating screw and nut are hardened and ground. The cross slide ways are protected with bellows way covers and the column ways are completely shielded at all times.

The machine is equipped with the ELECTRO-AUTOSIZING in-process gauging for solid or interrupted work surfaces with automatic spark out to move the table to the loading position from gauge control.

The Thompson Grinder Company, 1534 Zischler Street, Springfield, Ohio.

Use postpaid card. Circle No. 84

THREAD GRINDERS

Jones & Lamson Machine Company 839

Jones & Lamson will introduce a "brand new, low cost, small precision thread and form grinding machine." Details on this machine are still considered as classified by the builder, but will be released at show time.

This machine was originally to be designed specifically for satellite shops

In an iceberg or in a J. K. Smit Diamond Tool only a fraction shows above the surface.

Everyone knows about the unseen portion of an arctic iceberg. Many do not realize the unseen factors that lie beneath the surface of a J. K. Smit Diamond Tool, such as . . . our constant research to find still better methods of manufacturing Diamond Tools, the unquestioned integrity of our company since 1888, the manufacturing skills that have been learned and passed on through all those years, and quality control of manufacture for tool duplication.

All these hidden assets count much toward maintaining our position as a leader in the industry today.

When *your* next job specifies a diamond tool for any purpose contact J. K. Smit. Our field representatives are trained and qualified to assist you with any standard or special application.

J. K. SMIT & SONS, INC.
HOME OFFICE AND PLANT
MURRAY HILL NEW JERSEY

Additional plants in London, Paris, Amsterdam and Toronto, Canada

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MACHINE TOOL SHOW

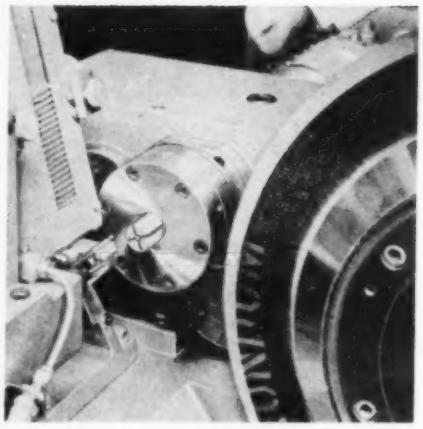
(Continued)

in the electronics industry, but its design has been embellished to include work performed in a larger segment of the metalworking industry.

Another machine being exhibited for the first time is the Model F thread grinding machine. This is designed for high production thread grinding of small parts. It is said to be particularly applicable to thread grinding operations on all standard taps, with manual or automatic handling. Photo at right.

Jones & Lamson Machine Company, 522 Clinton St., Springfield, Vermont.

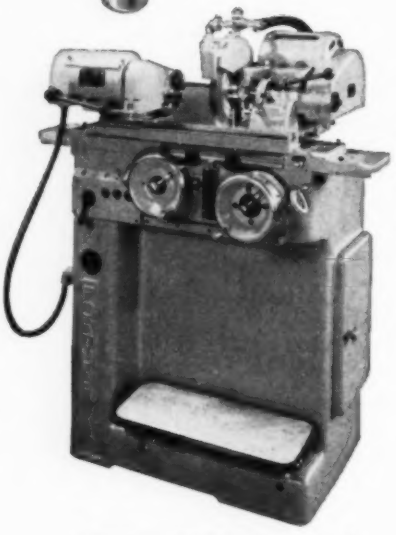
Use postpaid card. Circle No. 85



Precision Grind Small Parts On A Fortuna

The Fortuna 200 series of cylindrical grinding machines provides accurate, dependable grinding of a wide variety of small parts—injection needles, servo valves, watch parts, or wherever highest accuracy is required. Parts can be ground between centers, with high-precision collets, in chucks, or on face plates.

With a Fortuna even unskilled operators can obtain extremely fine limits of accuracy.



A Fortuna UME 200 Universal Cylindrical Grinding Machine

LME 200—For internal grinding.

RME 200—For external grinding.

UME 200—For universal grinding—with double-swivel grinding head if desired.

Also available—all types of precision internal grinding spindles—including high frequency spindles up to 120,000 r.p.m.

Write For Additional Information

COSA *Importers of Leading Precision Machine Tools*
Nationwide Sales and Service
COSA CORPORATION, 405 LEXINGTON AVENUE, NEW YORK 17, N.Y.

Visit COSA'S Exhibit

Coliseum Machinery Show, Sept. 7-15

• Booths 117 and 653 •

Use postpaid card. Circle No. 258

The Sheffield Corporation 201

Sheffield's Model 103 thread and form grinder is used to grind precision threads and worms and to grind cylindrical forms. The grinding wheel is formed by Crushtrue® dressing or by diamond dressers.

Threads can be ground to within a pitch and a half from a shoulder.

The Sheffield Corporation, Box 893, Dayton 1, Ohio.

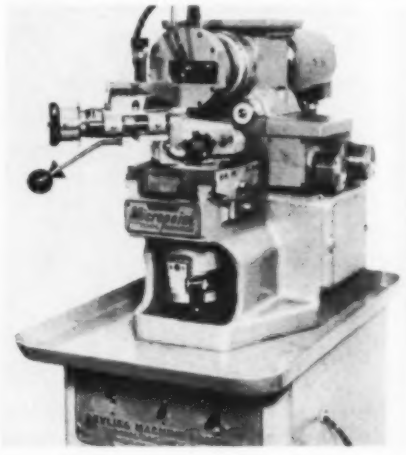
Use postpaid card. Circle No. 86

TOOL AND CUTTER GRINDERS

DeVlieg Machine Company 431

The DeVlieg Micropoint tool grinder to be exhibited is said to be the first capable of absolute control of tool geometry.

This precision machine, it is claimed, makes possible a new technique of single point tool grinding. Advantages of the new technique include greater



cutting tool life, increased accuracy and output of machine tools, and greatly improved uniformity and finish of the end product.

Recommended as being particularly important in grinding pre-set tools for numerically controlled machines.

DeVlieg Machine Company, Jigmil Division, Fair Street, Royal Oak, Mich.

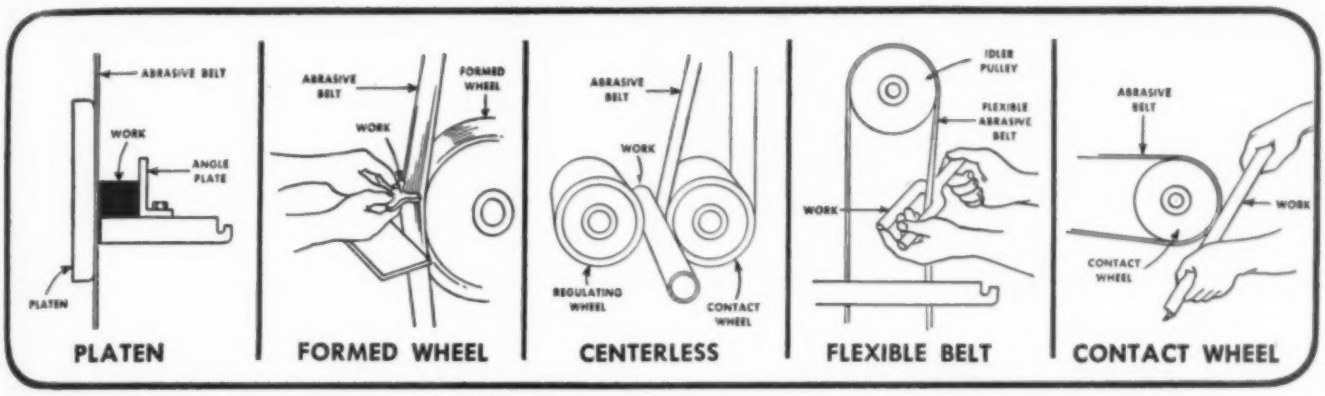
Use postpaid card. Circle No. 87

Ex-Cell-O Corporation 946

The Ex-Cell-O Model 264 reciprocating grinder is a dual purpose electrically-aided tool grinder designed especially for grinding carbides.

(Continued on page 64)

BELT GRINDING: opportunity unlimited for faster finishing and metal removal

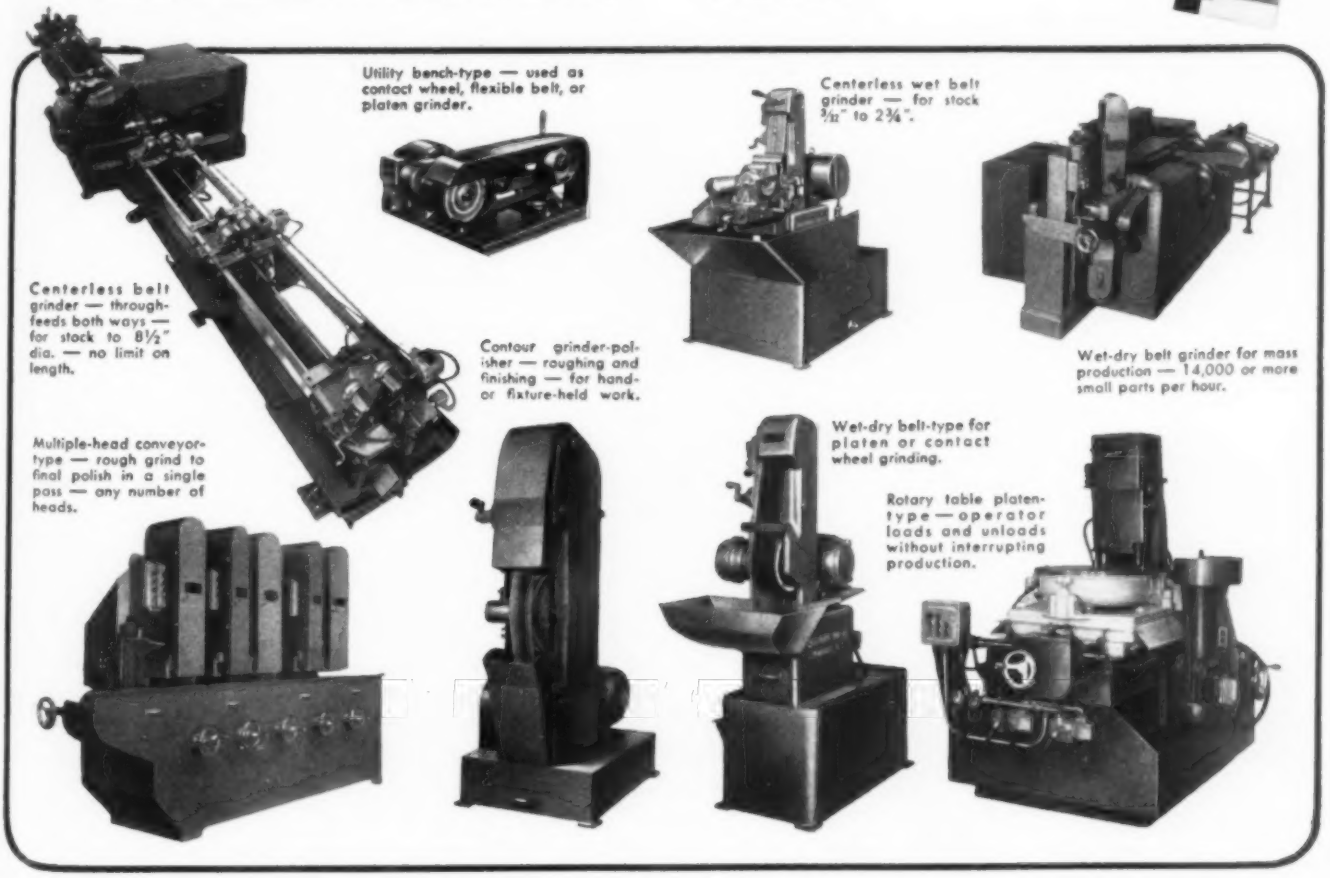


The opportunities for application of Sundstrand Engelberg precision abrasive belt grinders to improve quantity and quality of work are a stimulus to the imagination of creative methods men.

The belt grinding principle provides exceptionally rapid stock removal — up to three pounds of non-ferrous metal per minute! It speeds production and reduces costs because on most jobs it's from two to eight times faster. Setups are simple . . . tool dressing or grinding is eliminated . . . change-over takes but a few minutes . . . fixturing is simpler . . . and surface finish normally is markedly improved.

Wet and dry belt types are available for every requirement from toolroom work to automatic production of as high as 15,000 parts or more per hour.

A few of the many models of Sundstrand-Engelberg grinders are illustrated below. For more complete information, ask for descriptive literature.


Utility bench-type — used as contact wheel, flexible belt, or platen grinder.
Centerless wet belt grinder — for stock 3/32" to 2 3/4".
Centerless belt grinder — through-feeds both ways — for stock to 8 1/2" dia. — no limit on length.
Contour grinder-polisher — roughing and finishing — for hand- or fixture-held work.
Wet-dry belt grinder for mass production — 14,000 or more small parts per hour.
Multiple-head conveyor-type — rough grind to final polish in a single pass — any number of heads.
Wet-dry belt-type for platen or contact wheel grinding.
Rotary table platen-type — operator loads and unloads without interrupting production.

SUNDSTRAND ENGELBERG

SUNDSTRAND-AMERICAN BROACH

ANN ARBOR, MICHIGAN • DIVISION OF SUNDSTRAND CORPORATION

Use postpaid card. Circle No. 259

clear the air for production

Dust produced by grinding, chipping and similar operations is removed as created by down draft dust control systems, pioneered by Kirk & Blum.

Whatever your problem in industrial dust control, call on Kirk & Blum, an organization of engineers and mechanics with 50 years' experience in this specialized field.

Write for complete information.
The Kirk & Blum Manufacturing Co.,
3124 Forrer Street, Cincinnati 9, Ohio

KIRK & BLUM DOWN DRAFT DUST CONTROL

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MACHINE TOOL SHOW

(Continued)

Features of the machine are a diamond wheel and large tool rest table for face grinding at one end, and a narrow straight wheel at the other end for grinding chip breaker grooves.

Other features include a tank within the machine base for the electrolytic solution and a motor-driven pump to supply the solution to the grinding wheels. The angular setting of the table is easily adjustable.

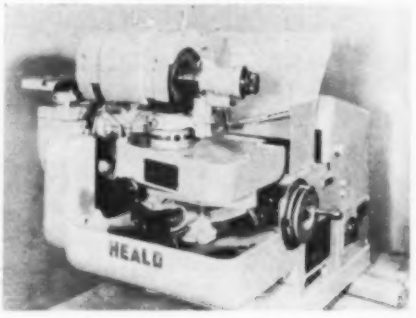
Ex-Cell-O Corporation, 1200 Oakman Blvd., Detroit 32, Michigan.

Use postpaid card. Circle No. 88

The Heald Machine Co. 924

The Model 4 tool sharpener permits either elliptical or true radius tip grinding of carbide or high-speed steel cutting tools.

The conical shape, with constant clearance angle and tool tip radius, produced in true radius tip grinding is ideal for contouring work. Greater boring accuracy results since tool contact



varies with workpiece configuration. The Model 4 Tool Sharpener combines adjustability of the axis of tool holder oscillation with an additional fine radius vertical setting to grind true-radius. Tool reciprocation is completely automatic and setup and operation extremely simple.

The Heald Machine Company, 14 New Bond Street, Worcester 6, Mass.

Use postpaid card. Circle No. 89

Norton Company 651

The Norton No. 200 cutter and tool grinder is a brand new machine never before announced or shown. It is designed for general tool room use in resharpening practically all metalworking tools.

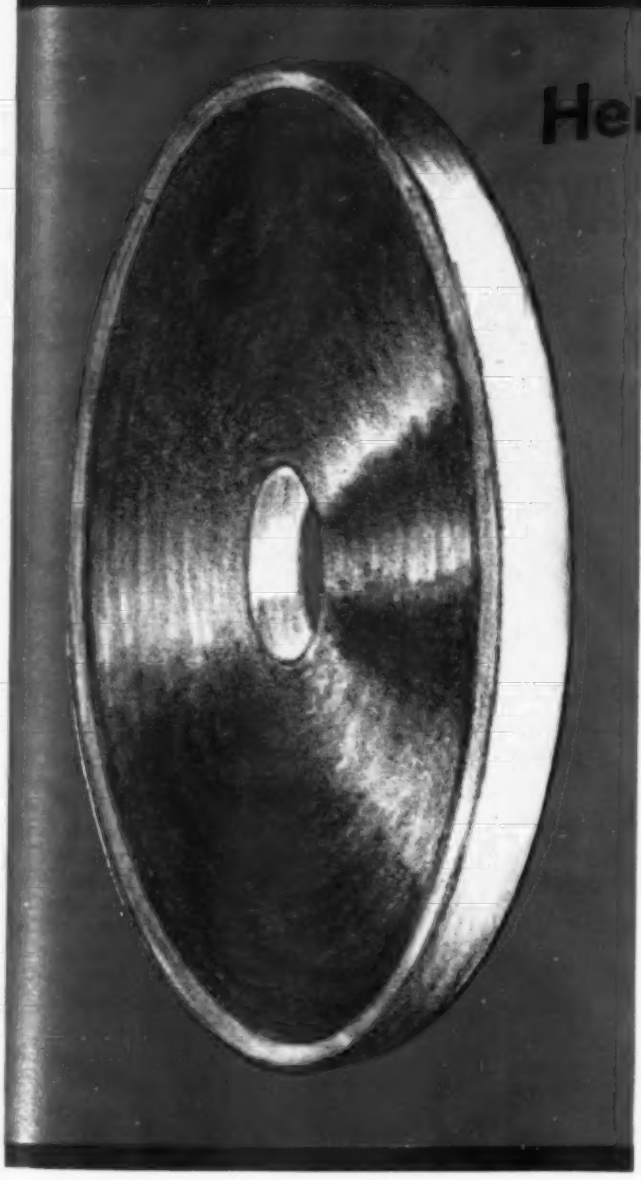
The new design permits faster clearance angle setting. Clearance angles are read directly from a scale on the tilting wheel head. In addition, with the tilting feature, the tooth rest remains set on the center line of the cutter for practically all grinding jobs. This eliminates

(Continued on page 66)

Your guarantee
each diamond crystal
is anchored more firmly in

JETALINE

Metal Bond Diamond Wheels



Here is what ACTION'S Pressure Cast Bond means to you . . .

- The best bond for cutting carbide, glass, ceramic, stone, cement, and carbon.
- Faster, freer, better finishes.
- An all-purpose bond that replaces resinoid and vitreous wheels.
- Chip free carbide grinding with full flow coolant.
- Load free operation.
- Less dressing time.
- Longer wheel life.
- Heavy duty operation.
- The best bond for finer micro finishes.

You are Invited . . .
to write for further information on the exclusive advantages of using Action's Pressure Cast Bond wheels.

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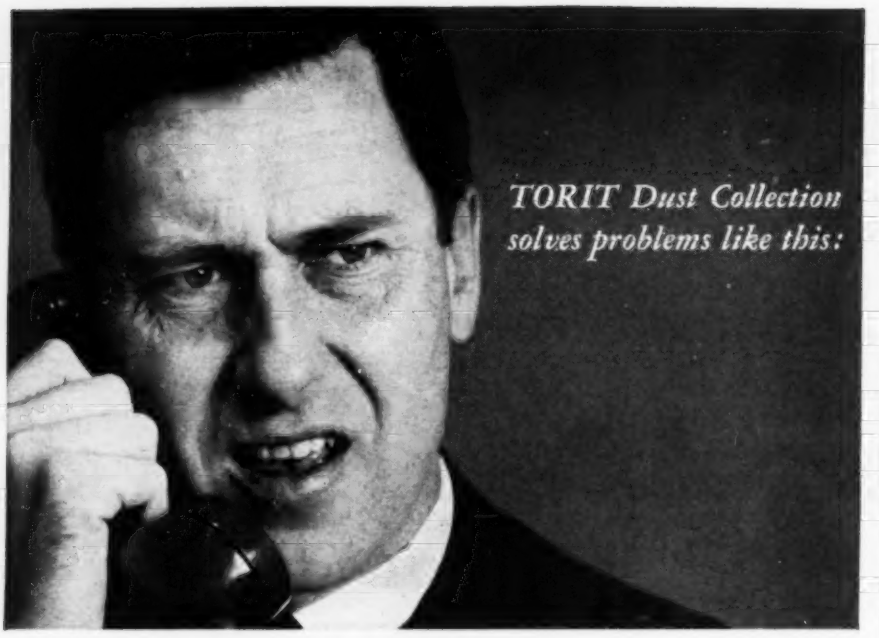


"6 MEN OUT AGAIN TODAY?" "WHY?"

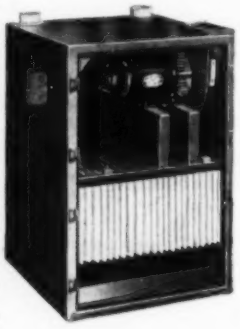
"I was on the receiving end of that question. And I knew what the boss was driving at. Production-wise, we couldn't stand our current rate of absenteeism. Even the men on the job were dragging their feet. To show you what I mean: we had just lost one of our best customers. Reason: one too many late shipments.

"Logically, when sickness strikes, you consult a doctor. Which is what I did. Without actual examinations, he couldn't diagnose the trouble. But he did give me the clue when he asked, 'How are your working conditions?'.

"Frankly, our plant is dirty. Or better put, dusty. With grinding machines running 24 hours a day, how could it be anything else? With that thought, I remembered. A salesman had been in my office just the other day talking about dust. I had too many production headaches at the time to hear him out. But I kept his card. So I called him back.

"He was from Torit. He was selling Torit Dust Collectors . . . machines that trap dust. When I compared the low cost of his equipment with the high cost of our production lag, I decided it was worth a try. So I bought one . . . just one, to start, for $285.00. We installed it ourselves on a key machine.

"The change in the man operating that machine sold me. Within a month, we had a Torit Dust Collector system attached to seventeen dust-producing machines in the plant. As a result, the air in our plant is clean, the way it should be. Our absentee rate is no longer a problem. Our production rate is at top speed. And you know something? I feel better myself!"



Is dust doing you *dirt? For complete facts on dust damage . . . and how to control it . . . write:*

TORIT manufacturing company

Dept. 524 1133 Rankin St., St. Paul 16, Minnesota

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MACHINE TOOL SHOW

(Concluded)

having to set the tooth rest at different heights for clearance angles setting on each job.

Quick setting for taper grinding is made possible by provision in the table design for use of gage blocks. This feature also makes possible fast return of the table to a straight setting.

The No. 200 is a wheel slide type of machine and the grinding action is always within the area of the rigid base. There is no instability due to work overhang. This feature contributes to excellent finish on cutting tool edges which in turn means longer tool life and better performance.

Eccentric mounting of the wheel head extends the capacity of this machine in many special jobs where maximum swing is required.

Norton Company, 1 New Bond Street, Worcester 6, Massachusetts.

Use postpaid card. Circle No. 90

Oliver Instrument Company 342

A completely new version of the Model "624" automatic face mill grinder, along with three other tool and cutter grinders, will be shown.

The new "624" face mill grinder has increased capacity, can take face mills from 6" to 24" in diameter. In addition, new tooth forms can now be ground, including the periphery of the cutter. The operation is completely automatic, freeing the operator for other work while the cutter is being ground.

The heavy duty "Ace" tool and cutter grinder reverses the usual concept of this operation. On the "Ace" the work is held stationary and the grinding wheel moves on and off the area to be ground.

Another special "Ace" tool and cutter grinder is designed for grinding carbide tipped circular wood saws. A grinder for single point convex high speed steel or carbide tipped tools completes the tool and cutter grinding section of the exhibit.

Oliver Instrument Company, 1408 East Maumee Street, Adrian, Michigan.

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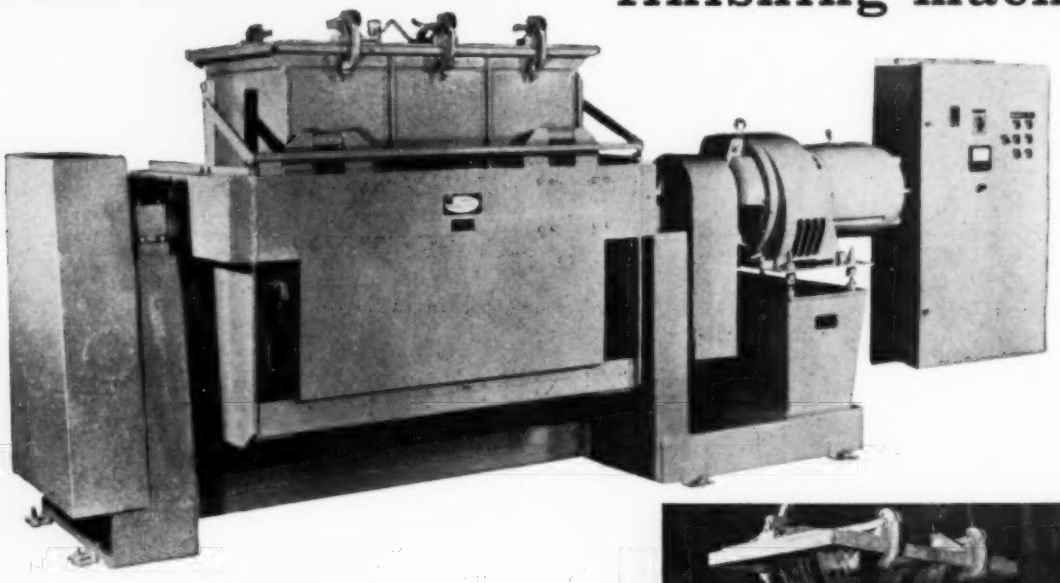
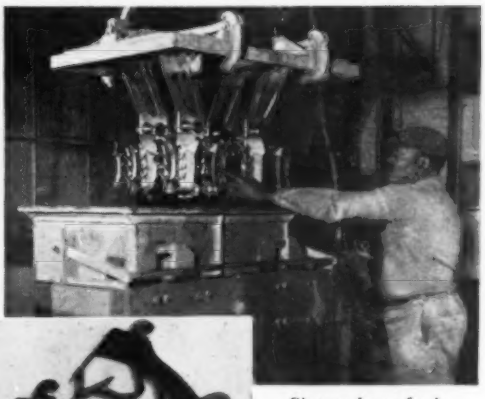
SAM SAFETY says:

what makes LORCO® the outstanding vibratory finishing machine?





Sixteen brass feed frames are fixtured for finishing in a Lorco vibrator. Cost saving $3.30 per unit.

ANSWER: Lorco builds outstanding performance into its vibratory finishing machines by providing those extra quality features that our long experience has shown pay off in better finishing results and lower finishing costs.

The Lorco lubrication system, for example. There is less costly equipment to lubricate the main bearings—but Lorco gives you an Alemite Oil Mist system that keeps foreign matter out of the vital bearings while it lubricates. And the Lorco *detachable* bowl construction—heavy gauge steel plate, all welds stress relieved by heat treatment, entire surface shot peened, with extra durable calendered rubber lining vulcanized to the metal.

Design features like these have proven their worth to over a hundred users, large and small, including many plants now operating several Lorco vibrators. At lowest finishing cost, and with minimum operating cost, these plants are achieving results that would be impossible with any other kind of equipment.

The F.J. Stokes Co. of Philadelphia, Pa. is typical. The parts illustrated at right formerly were filed, ground and buffed by hand, at a cost of $4.00 per piece. With a Lorco vibrator, they now deburr and finish these parts in record time, at a total cost of only 70¢ each, including all labor, operating and overhead costs.

Lorco's Unequaled Experience is at your service. Call on your Lorco engineer for the practical solution to finishing your "problem" parts. Or write today for details of Lorco experimental finishing service, and media and compounds for precision barrel and vibratory finishing.

LORD CHEMICAL CORP.

2068-C South Queen St.
YORK, PENNSYLVANIA

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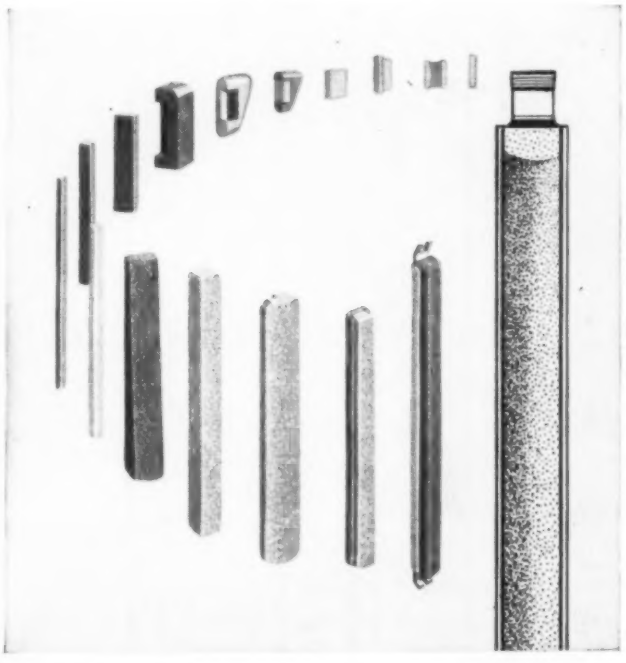
How uniformity in Honing Stones has been developed by the Micro-Bond Method

Not too many years ago, honing was a hit-or-miss operation and the production of a desired surface finish was a matter of chance, not skill. This situation was due to the variance in hardness of the honing stones. Stones supposedly identical in grade were found to be of varying grade. Since hones are generally used in "sets", it was entirely conceivable that one or more stones within a set could vary in hardness from the other stones within that set. Due to this difficult situation, it was almost impossible to predict what a stone or set of stones would do on any given operation.

Guess work had to be eliminated. The engineers at Mid-West Abrasive Company began working on honing stones that would have uniform grain, grade and dimension. They realized that if high production honing was ever to become a reality, the quality of such stones would have to be controlled to a fine degree. Through the research efforts of these engineers, the Micro Bond honing stone was developed.



This picture shows a number of sizes and shapes of honing stones that are used in a wide variety of honing operations.

HIGH PRODUCTION OBTAINED

Today, honing is a high production practice. It is more than a method of producing fine finishes; it will also remove stock faster than most other abrasive methods. While producing a finish having a micro inch root mean square reading of from 2 to 5, internal honing removes stock extremely fast, averaging .0007 to one cubic inch per minute in bore diameter four and one-half inches and over. A good rule of the thumb for stock removal ratio between abrasive and material removed is five to one. Five cubic inches of material can be removed with one cubic inch of abrasive.

Honing with Micro Bond stones has also proven highly successful in generating true holes, free from taper, out-of-roundness, and axial distortion. By using the proper stones, honing can finish a bore to extremely close tolerance, and at the same time will improve taper and out-of-roundness left in the bore by the previous operation.

WIDE RANGE OF GRIT AND GRADE

As with grinding wheels, the grain size determines whether a honing stone is best suited to "roughing" or "finishing", although there is a much more delicate line of demarcation between the two operations. For example: Operation "A" calls for removal of .015 inches of stock and a finish of 3 micro inches. That would require two stones, one for roughing (ranging from a 100 down to a 180 grit), and another for finishing (ranging from 400 down to 600 grit). The intermediate grits may be used for either roughing or finishing, or for both roughing and finishing, depending upon the stock removal and finish specifications of the job.

Operation "B" may be such a job. Instead of having to remove 15 thousandths inches, as was the case in operation "A", operation "B" calls for removing only 3 thousandths inches, and for finishing to only 6 micro inches. Operation "B", therefore, could be a one stone operation, calling for stones having grain ranging from 280 down to 320.

BEFORE DECIDING ON A PARTICULAR STONE

Determination of whether a given honing operation is a one stone or two stone job is one of six extremely important factors the operator must consider before deciding on the proper grain and grade for the job. The five remaining factors are:

1. The Rockwell hardness of the material being honed.
2. Metal specifications of the material.
3. The amount of stock to be removed.
4. The micro inch finish required.
5. Time allowed for the honing operation.

The work motions of honing stones are referred to as "feed" and "speed" or as "rotation" and "reciprocation". These movements result in a cross-hatched pattern that is controlled by adjustments in reciprocation and rotation to effect the desired functional finish.

The relationship between rotation and reciprocation in the honing of a bore is determined by the size of the bore, the hardness of the material being honed, and the type of finish desired. Speeds normally range from 100-200 SFPM.

HONING PRESSURES AND COOLANTS

Two additional factors in honing must be considered. Both are very important. They are (a) pressure, and (b) coolants.

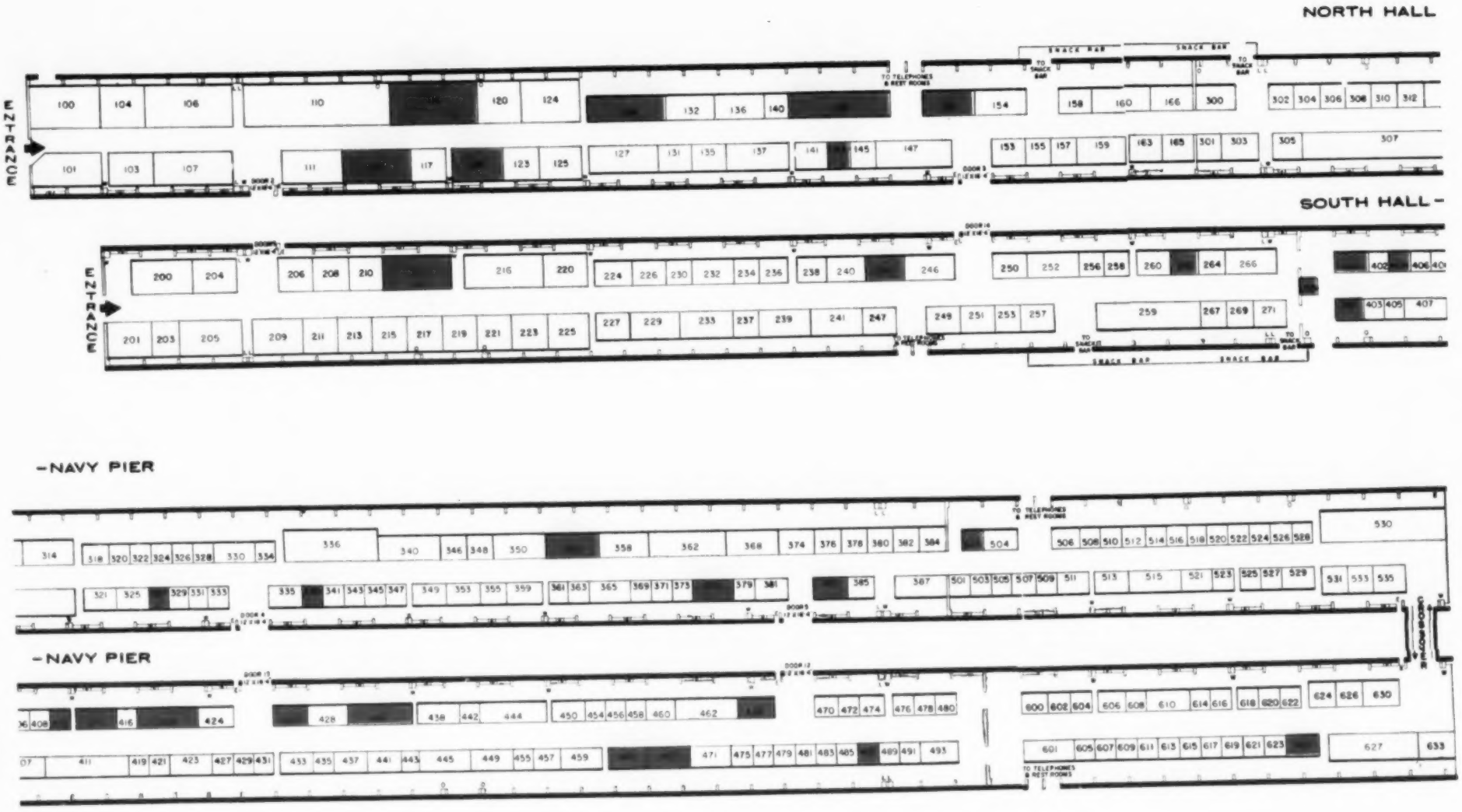
One of the fundamental facts of honing is that a given hone will remove stock faster from hard steels with light pressure and that in honing soft metals high pressure is generally required. Of course the pressure varies with the type, the heat treatment and other physical properties of the material being honed. The development in special coolants, in the past few years, has been extraordinary. Many companies are now producing standard ready mix coolants which readily are applied to any particular job. The Mid-West Abrasive Company's engineers are able to furnish recommendations on various coolants for jobs of almost any description.

Write Midwest Abrasive Company, Owosso, Michigan with your particular honing problem.

(Advertisement)

Use postpaid card. Circle No. 264

NAVY PIER


NORTH HALL
SOUTH HALL
NAVY PIER
NAVY PIER
NAVY PIER
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1960 Production Engineering Show

● Over $10,000,000 worth of equipment will be shown at the Production Engineering Show. This show, which is being held for the second time in conjunction with the Machine Tool Exposition, will be at Navy Pier. Equipment at the show is described as products which support prime production tools. Therefore, the exhibits as well as the hours of the show compliment the machine tool show. Hours are from 1:00 to 10:00 P.M. on the same September 6 to 16 dates.

The Production Engineering Show will have approximately 300 exhibitors, up 50% from 1955 and will occupy twice the space. Many of the products shown at this show may be seen in actual operation on equipment at the machine tool show.

Admittance is by registration only at the show or at the International Amphitheatre. Both of these shows can be attended for the $3.00 fee paid on admittance to either. Rapid registration cards can be obtained from representatives of exhibiting companies. Telephone number for the show will be WHitehall 3-5200.

Special buses will operate, during show hours, between principal loop hotels and Navy Pier located at Grand Avenue and Lake Michigan. Doormen at the hotel will inform you of the loading area. Buses will be marked: "Production Engineering Show." Buses will also travel nonstop to and from the International Amphitheatre and the two airports, Midway and O'Hare.

By private car, go north on any loop street except Michigan Avenue to Grand Avenue and east to Navy Pier. Taxi fare is approximately $1.00 plus $.20 for each additional passenger. Time is about 10 minutes.

How To Use This Issue:

To the left is a map of the booths at the Production Engineering Show. On this page is an index of those companies which will be displaying grinding and finishing equipment. All of this type of equipment which will be shown is listed under the name of the company and booth number. Those products we have singled out for discussion are listed with the page number following. Product descriptions are grouped by types. • • •

Index of Grinding and Finishing Exhibitors

Participants showing grinding and finishing machines and equipment are listed with their booth numbers in alphabetical order below. Page cross-references are given for products described in detail elsewhere in this issue.

Buck Tool Company 244
Kalamazoo, Michigan
Grinding accessories (Chucks), p. 76.

The DoALL Company 116
Des Plaines, Illinois
Gages, p. 74.

Enco Manufacturing Co. 468
Chicago, Illinois
Grinding accessories (Adjustable work center), p. 78.

Hammond Machinery Builders, Inc. 432
Kalamazoo, Michigan
Abrasive grinder, p. 74; Dust collectors; Polishing and buffing equipment; Electrically-aided grinders.

The Lufkin Rule Co. 426
Saginaw, Michigan
Gaging equipment, p. 75.

Magnaflux Corporation 400
Chicago, Illinois
Gaging equipment, p. 75.

Micrometrical Mfg. Co. 418
Ann Arbor, Michigan
Gaging equipment, p. 75.

National Diamond Lab. 299
Peekskill, New York
Mounted points (diamond), p. 80.

Opto-Metric Tools, Inc. 412
New York, New York
Gaging equipment, p. 75.

The Osborn Mfg. Company 375
Cleveland, Ohio
Metal finishing machines, p. 80.

Precise Products Corp. 625
Racine, Wisconsin
Grinding accessories (Power quills), p. 78; Jig grinders, electric, p. 79.

Production Machine Co. 410
(Division of Wanskuck Co.)
Greenfield, Massachusetts
Abrasive belt grinder, p. 74.

Redin Production Mach. Co. 143
Rockford, Illinois
Gear deburring machines, p. 76.

Sigmamotor, Inc. 404
Middleport, New York
Grinding accessories (clamp pump), p. 78.

The Skinner Chuck Co. 212
New Britain, Connecticut
Grinding accessories (Chucks), p. 78.

The L. S. Starrett Company 150
Athol, Massachusetts
Gaging equipment, p. 76.

Stewart-Warner Corpn. 465
Chicago, Illinois
Grinding equipment and accessories, (Electronic balancer), p. 79.

Sunnen Service Corp. 327
St. Louis, Missouri
Gaging equipment. p. 76.

Torit Manufacturing Co. 401
St. Paul, Minnesota
Dust collectors, p. 74; Automatic filter shaker, p. 74.

Product Descriptions

Further information on all of the products described below is available on request. Use the Reader Service Card, page 69.

ABRASIVE BELT GRINDERS

Hammond Machinery Builders, Inc. 432

A new line of abrasive belt grinders, designated as Model UBG-50, will be on display.

The photo below shows a grinder with a buffing hood and built-in Duskolector. Other variations are available.

In another variation the unit is equipped with two pulley U2 heads, with platens and work rests. With this arrangement, it is possible to grind on the belt against a contact wheel, on the platen, or on slack-of-belt, in either vertical or horizontal position.

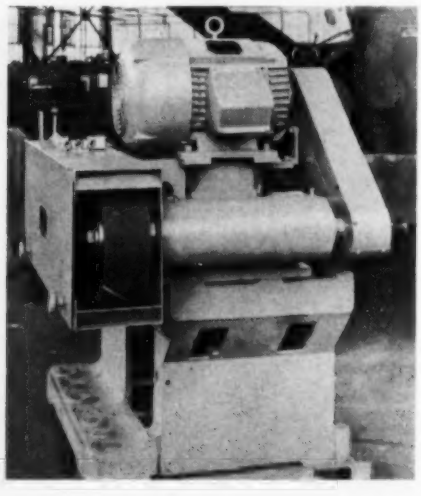
Hammond Machinery Builders, Inc., 1600 Douglas Avenue, Kalamazoo, Mich.

Use postpaid card. Circle No. 92

Production Machine Co. 410

The exhibit of Production Machine Company will show, for the first time, an abrasive belt grinding attachment for heavy duty machine tools.

An entirely new design of grinding machine, it is built for mounting on heavy duty lathes, mills, planers, or other machine tools where grinding operations are required.



The standard model can be furnished either right or left hand assembly and uses contact wheel 12" diameter and abrasive belts up to 4" wide, 86" long. Belt tension is maintained by air or hydraulic cylinder and tracking control is within easy reach of the operator.

Arranged with timing belt drive for 5 hp motor it can be furnished for various belt speeds suitable for many grinding and finishing operations. This unit may also be mounted in horizontal, vertical or angular positions.

Production Machine Company, Wells Street, Greenfield, Massachusetts.

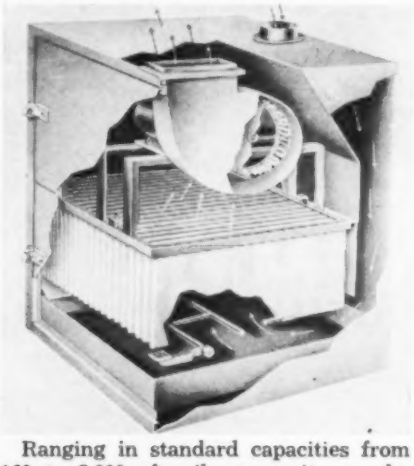
Use postpaid card. Circle No. 93

DUST COLLECTORS

Torit Manufacturing Co. 327

Cabinet cloth filter dust collectors, whose efficiency is nearly 100 per cent in typical industrial applications, will be among the equipment displayed by Torit.

Compact and self-contained, Torit's cabinet collectors are available in a variety of standard and custom sizes for all types of applications where removal of gritty dust is required, such as in sanding and grinding operations. Efficiency of these units is so high—due to specially woven cloth filters—that filtered air can be recirculated in production areas to provide additional savings in fuel costs.



Ranging in standard capacities from 160 to 2,000 cfm (larger units can be specially built), Torit cabinet collectors can be tailored to any type of machine operation.

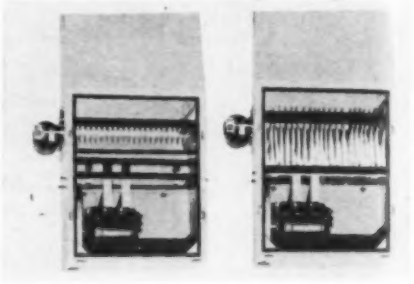
Torit Manufacturing Co., 1133 Rankin Street, St. Paul 16, Minn.

Use postpaid card. Circle No. 94

Torit Manufacturing Co. 401

A newly developed, highly efficient automatic filter shaker, now available on all models of Torit cloth filter type dust collectors, is also being featured.

The automatic shaker is powered by an independent electric motor mounted on the side of the collector. When the shaker bar is oscillated horizontally, its metal fins strike each cloth filter bag to free the dust particles and cause them to drop into the dust tray.



Shaking action begins automatically whenever the collector motor is turned off. After shaking the filters for two minutes, the mechanism shuts itself off and will not operate again until the collector has been turned on and off again.

Available with single phase, 110 or 220-volt, 60 cycle motors, the shaker can be used regardless of the voltage of the collector.

Torit Manufacturing Company, 1133 Rankin Street, St. Paul 16, Minn.

Use postpaid card. Circle No. 95

GAGING EQUIPMENT

The DoAll Co. 116

DoAll gaging experts at Navy Pier will demonstrate precision measuring techniques becoming more and more essential in quality control programs in industry. They will show how to inspect cutting tools with a stereo zoom microscope, with a Bausch & Lomb bench comparator, and with bench centers.

Other new products that represent marked advances in metrology are a reversible, double-faced black granite surface plate which gives users two finished surfaces to the same or different grades for only 30% extra cost; stainless steel gage blocks with always-visible side-etched sizes.

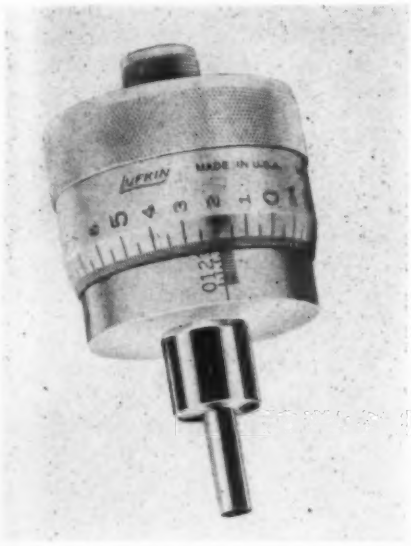
The DoAll Company, 254 North Laurel Avenue, Des Plaines, Illinois.

Use postpaid card. Circle No. 121

The Lufkin Rule Co. 426

Featured in the Lufkin display will be a number of gages and gaging accessories.

Shown below is a new large diameter micrometer head, No. 1011, designed for applications requiring extra fine adjustments. It is also used on special gages and tools. Usually it is read from left to right, but may be had with markings on the hub reading both ways.



Other units exhibited will be a new dial test indicator and a new stainless steel radius gage.

The Lufkin Rule Company, 1700 Hess Street, Saginaw, Michigan.

Use postpaid card. Circle No. 96

Magnaflux Corporation 400

A new portable ultrasonic thickness measuring instrument, the Sonizon SO-300, will be on display. This fully transistorized battery-powered unit measures the thickness of steel, brass, nickel, copper, aluminum, and other materials that transmit ultrasonic sound vibrations.

From simply placing a probe on the surfaces of the piece to be measured, the SO-300 gives a direct and instantaneous reading of thickness. Improved features, according to the manufacturer, include a rugged chassis, greater sensitivity, simplified controls, and easier read-out.

Magnaflux Corporation, 7300 West Lawrence Avenue, Chicago, Illinois.

Use postpaid card. Circle No. 97

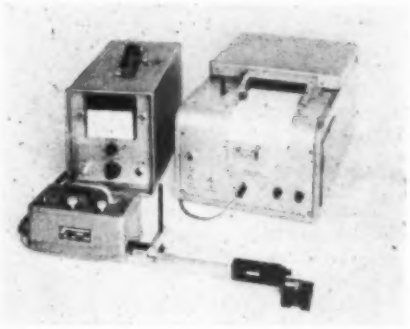
Micrometrical Mfg. Co. 418

Instruments for measuring surface finish make up the display of the Micrometrical Manufacturing Co.

The Microcorder® pictured below is an electro-mechanical instrument which provides a permanent magnified chart of the roughness profile of a surface.

It is said to be particularly useful for studying surfaces which are pitted or porous, or which have flaws, scratches, or other irregularities.

The Profilometer® (not illustrated) is a direct-reading instrument for measuring surface roughness in microinch units. It is said to be able to measure



any machined or finished surface, internal or external; straight, tapered or circular.

Micrometrical Manufacturing Co., 345 South Main Street, Ann Arbor, Mich.

Use postpaid card. Circle No. 98

Opto-Metric Tools, Inc. 412

Six new inspection and testing instruments will be shown for the first time:

An Auto-Collimator with double range of 30 minutes, which incorporates a very compact design of 20" focal length by folded beam, 2¼ aperture and purely optical reading in ½ second;

Light wave surface tester for checking ultra-fine finishes by light interference without touching the surface;

Duplex hardness tester, combining means for normal and superficial Rockwell tests in one machine with push-button load selector;

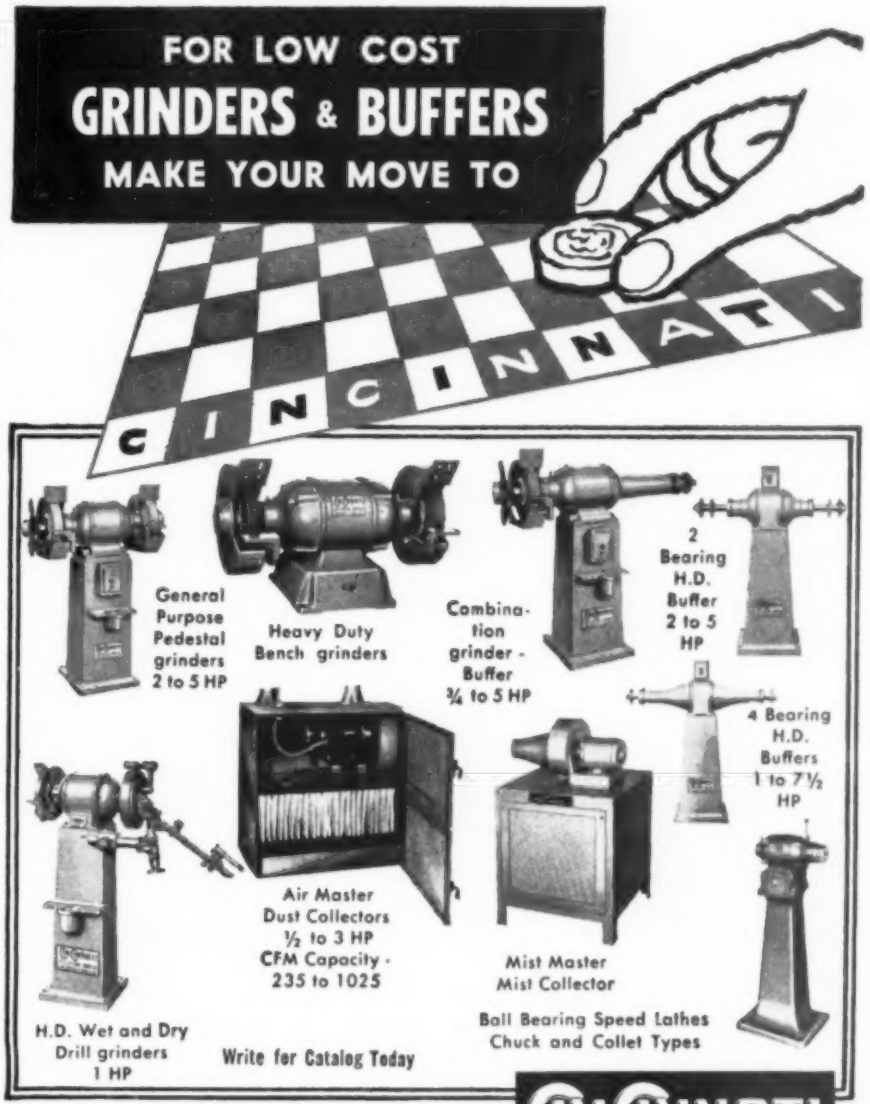
20" pedestal type optical comparator with wide-field lenses, vertical light beam, and horizontal measuring stage in .0001";

3" x 8" universal toolmaker microscope and 6" x 6" coordinate measuring microscope.

Opto-Metric Tools, Inc., 137 Varick Street, New York 13, New York.

Use postpaid card. Circle No. 99

(Continued)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The Cincinnati Electrical Tool Co.
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PRODUCTION ENGINEERING SHOW

(Continued)

The L. S. Starrett Co. 150

Eighty-eight new tools will be included in the Starrett display of products, among them vernier and micrometer calipers, inside micrometers, dial indicators, and dial bore gages.

Typical of the tools now available with no-glare Satin-Chrome finish for easier reading and high resistance to corrosion and wear is the No. 359 Series universal bevel protractor with vernier, ultra-fine adjustment and acute angle attachment.

Also featured in the Starrett exhibit will be new super-precision Dial Master dial indicators with accuracy of plus or minus .00001"; other indicators with an accuracy of .00005"; and a complete line of Starrett dial bore gages.

The L. S. Starrett Company, 1-165 Crescent Street, Athol, Massachusetts.

Use postpaid card. Circle No. 101

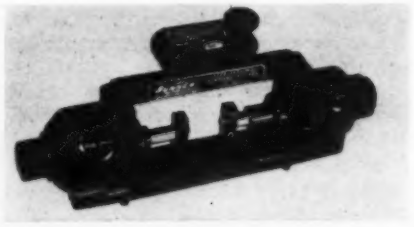
Sunnen Service Corp. 327

A new precision bore gage and size setting fixture will be featured in the Sunnen booth.

This new set is said to require no gage blocks, rings or other "masters" to set, check, or gage any hole size within its .375" to 2.900" measuring range.

According to the manufacturer, it is the only gage set on the market that allows the user to "dial-in" the actual desired dimension against which a part is to be measured or a "standard" is to be set.

1000:1 magnification makes it easy to read quarter-tenths (.000025"). A .0[illegible] I. D. variation makes the gage's indicating needle move one inch across the linear scale.



Sunnen Service Corporation c/o Department G-10, 7900 Manchester Ave., St. Louis 17, Missouri.

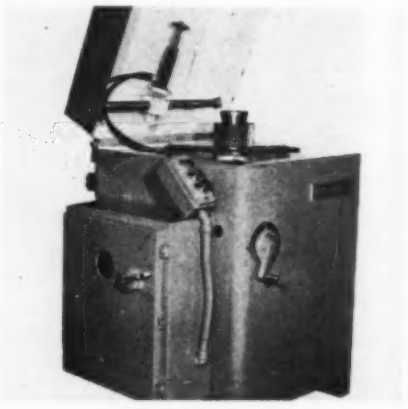
Use postpaid card. Circle No. 102

GEAR DEBURRING MACHINE

Redin Production Machine Co. 143

The Redin Model 20 gear deburring machine will be exhibited in operation on a production job.

Its capacity (external) is as follows: minimum pitch diameter—3"; maximum pitch diameter—20"; maximum gear face—6"; and minimum diametral pitch —16.



Its capacity (internal) is the same, except for maximum pitch diameter, which is 16" instead of 20".

Work speed is 1 to 10 rpm, and wheel speed is 11,000 rpm. Maximum wheel size is 4" diameter x $\frac{1}{8}$" face.

Redin Production Machine Company, 2433 Twentieth Street, Rockford, Ill.

Use postpaid card. Circle No. 103

GRINDING EQUIPMENT AND ACCESSORIES

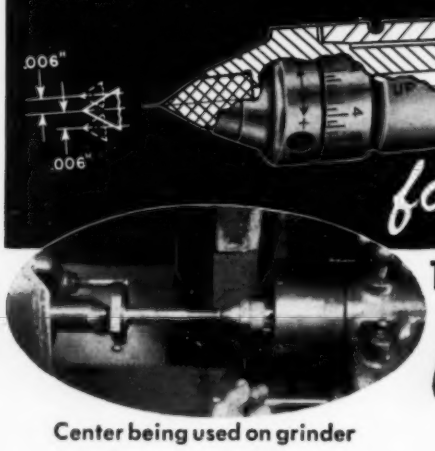
Buck Tool Company 244

Teams of chucks and turning fixtures, designed to eliminate the production loss now caused while automatic chuckers are down for turning jaws on the machines, will be featured.

Two types of jaw turning fixtures—the serrated master and American Standard—will be demonstrated. These fixtures duplicate the jaws of Buck power chucks. They are used in the tool room to hold top jaws for machining, or for grinding after hardening.

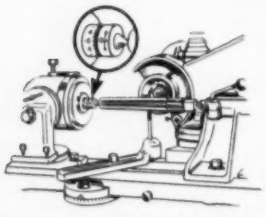
(Continued, page 78)

NEW . . . fast, easy CENTER ALIGNMENT for GRINDERS

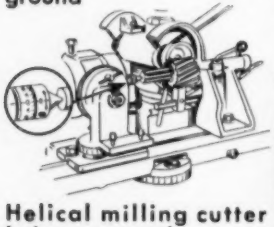


Center being used on grinder

The Enco® Micro-Set® Adjustable Center



Taper reamer being ground



Helical milling cutter being reground

- permits TRUE work alignment from tailstock or headstock on: cylindrical grinders, cutter grinders, gear shavers, lathes and tracer attachments.
- Saves one half the set-up time.
- Ends hit or miss table adjustments to obtain precise alignment.
- An inexperienced operator can get a precise alignment—easily—in seconds.
- Quickly pays for itself in time and scrap savings.

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#2 $49.50	#6, #7 $53.00	#6, #7 $53.00
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#4 76.00	#10, #11 85.00	#10, #11, #12 85.00

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We also manufacture Precision Lathe Turrets and Tiny-Titan Magnetic Base Holders.

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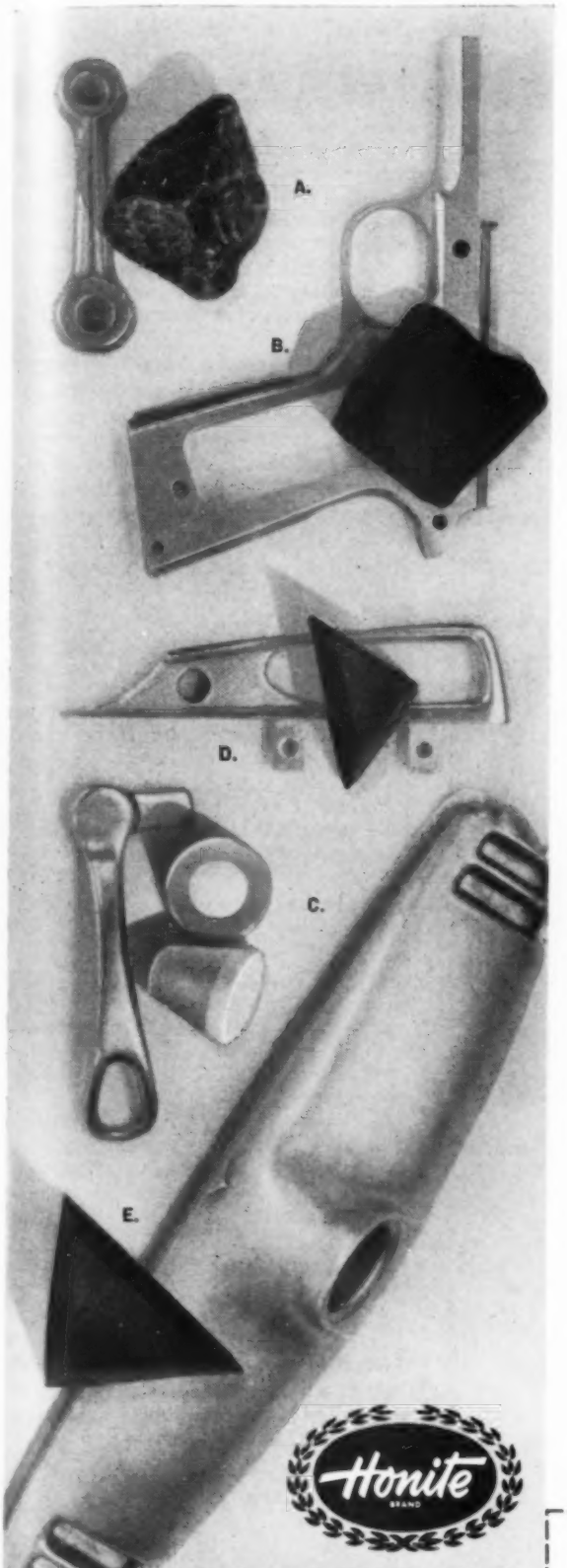

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Now from 3M research come the most efficient barrel finishing materials. A complete line of abrasive media and compounds to meet all your deburring, descaling, deflashing, coloring and burnishing needs and perform precision surface finishing.

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"HONITE" MEDIA

These five types of "Honite" Brand abrasive media are recognized as the best and most complete line for barrel finishing.

A. **"HONITE"** – A tough, low cost, long-wearing natural stone containing a micro-crystalline abrasive. Excellent for minor stock removal and burnishing in long run cutting cycles. Available in nine sizes. *The steel alloy outboard motor crankshaft pictured was descaled and smoothed with "Honite" and "Honite" Compound #280 followed by #373.*

B. **"SUPER-HONITE"** – A manufactured chip consisting of a fine-grained, fused aluminum oxide bonded abrasive. Fast cutting and long-wearing – provides a fine, smooth finish on all types of metal. Available in nine sizes. *The hard steel automatic pistol frame was deburred with "Super-Honite" and "Honite" Compound #240; polished with "Super-Honite"and "Honite" Compound #120.*

C. **"HONITE" BRAND CERAMICONES** – A long-wearing porcelain-type, ceramic medium manufactured in precise cone-shaped dimensions. Ideal for deburring, honing, coloring, or burnishing where lodging is a problem. *The yellow brass handle pictured was deflashed and smoothed with "Ceramicones" and "Honite" Compound #300.*

D. **"HONITE" BRAND Z-N TUMBLING SHAPE** – A light-weight medium featuring a new bonding material and extremely fine mesh abrasive. Designed to produce fine surfaces on zinc alloys and other metals prior to plating. Often eliminates the need for costly buffing. *The zinc die-cast locker handle pictured was honed and burnished for plating with "Z-N" 3T Tumbling Shape and a newly developed "Honite": Compound.*

E. **"HONITE" BRAND C-R TUMBLING SHAPE** – A light-weight, fast-cutting medium for use on all metals. Triangular shaped and extremely fracture resistant to prevent lodging. Light weight produces fine, micro-inch finishes without impingement. Available in three sizes. *The aluminum alloy vacuum cleaner head was deburred and prepared for painting with "C-R" 2T Tumbling Shape and "Honite" Compound #240.*

HERE'S HOW you can get the latest information on barrel finishing. VISIT THE "HONITE" BOOTH AT THE NATIONAL METAL EXPOSITION IN PHILADELPHIA OCTOBER 17-21.

Honite BRAND

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There are 14 "Honite" Compounds designed for all types of finishing. Select the compound that fits your needs from these classifications.

1. "HONITE" Abrasive compounds for rapid surface cutting and deburring.
2. "HONITE" Finishing compounds for burnishing, coloring, and light deburring.
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Please send me a copy of your free booklet on "Honite" Barrel Finishing: "There's Gold in Them Thar Barrels."

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Use postpaid card. Circle No. 265

PRODUCTION ENGINEERING SHOW

(Continued)

Chucks are the new Buck Ajust-Tru aluminum body chucks that provide a 40% weight saving, plus gibbed keyways to take up wear. The newest chuck, 18" in diameter, will be on display.

Buck power chucks and jaw turning fixtures in two- and three-jaw types are now available in sizes from 5⅝" to 18" diameters.

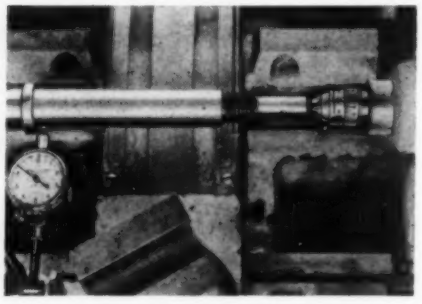
Buck Tool Company, 2015 Schippers Lane, Kalamazoo, Michigan.

Use postpaid card. Circle No. 104

The Enco Mfg. Co. 468

A new development called the Micro Set Adjustable Center will be featured.

Designed to permit quick, easy center alignment on old or new machines, the



adjustable center eliminates the guesswork and time-consuming tailstock jogging usually required for precision or taper turning, according to the manufacturer.

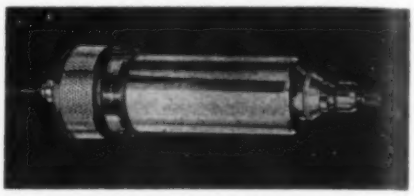
With the adjustable center, it is claimed that an operator can make precise headstock-tailstock alignment in half the time required by the old method.

The Enco Manufacturing Company, 4520 West Fullerton Ave., Chicago, Ill.

Use postpaid card. Circle No. 105

Precise Products Corp. 625

New Super Cycle power quills will be demonstrated running at constant speed under load in a range from 7,200 rpm to 54,000 rpm. Power output at the check is available up to 2hp. These new



power quills will be shown in three basic models which are fully interchangeable with the company's universal motor power quills.

Precise Products Corporation, 3750 Blue River Road, Racine, Wisconsin.

Use postpaid card. Circle No. 106

Sigmamotor, Inc. 404

A new type of kinetic clamp pump, designed to handle slurries such as abrasives in solution as well as other liquids and gases, will be shown.

The material to be pumped is moved through flexible tubing by the successive clamping action of radial arms operating on a tubing coil.

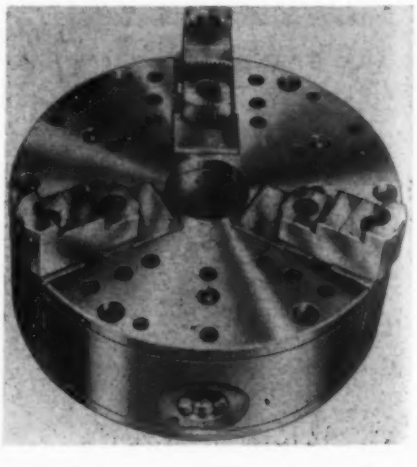
Pumping capacity is dependent on the diameter of the tube used and the speed of the rotor which deflects the arms. Using ¼" O. D. tubing, the maximum delivery is 110 ml/min. at 192 rpm of rotor.

Sigmamotor, Inc., 85 North Main St., Middleport, New York.

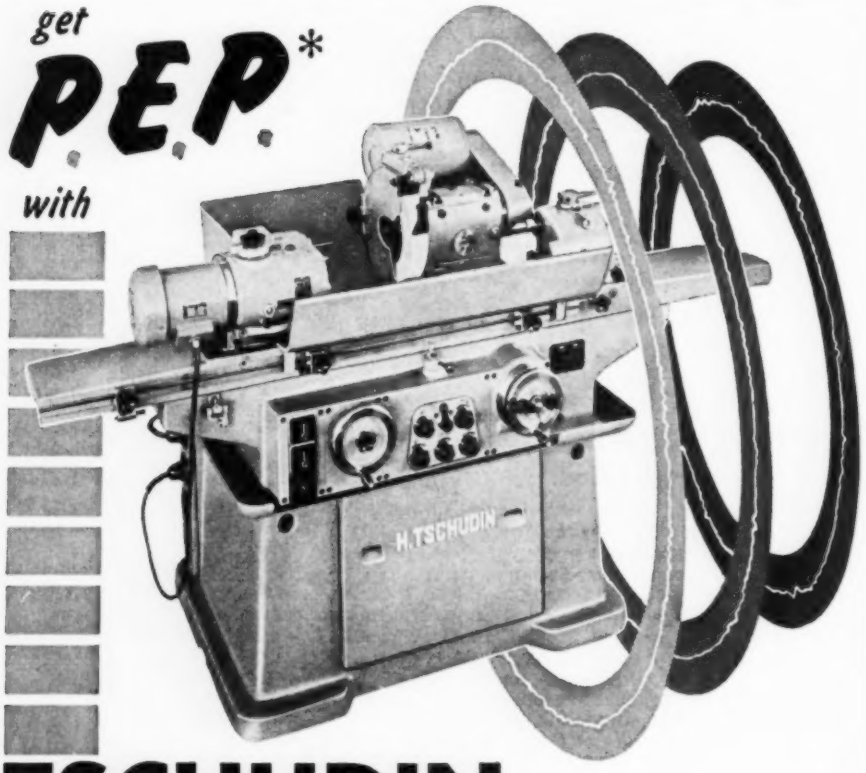
Use postpaid card. Circle No. 107

The Skinner Chuck Co. 212

A number of items, the majority of which have been on the market less than a year, will be shown.



get P.E.P.* with



TSCHUDIN
UNIVERSAL GRINDERS

AT LAST . . . a fully hydraulic grinder that will solve your close tolerance grinding problems **without** . . . using electronic equipment.

Infeed repeats within **20 millionths**
Work spindle runs round within **20 millionths**
Extremely high surface finishes
Unitized construction

3 sizes available: 8" x 12", 8" x 16", 8" x 24"

*Performance
Economy
Precision

See the TSCHUDIN under power! Fully equipped showrooms in: Philadelphia, Pa.—Detroit, Mich.—Chicago, Ill.—San Francisco, Calif.—Los Angeles, Calif.—Toronto, Canada.

ALINA Write for illustrated brochure and the address of nearest showroom.

ALINA CORPORATION
122 East Second Street, Mineola, Long Island, New York

Use postpaid card. Circle No. 266

The new wedge screw chuck, illustrated left below, is the first major chuck development in 50 years, it is claimed. It utilizes a combination of a pinion, gear plate, screw and wedge.

This new chuck has accuracy within .001 TIR, and repeatability within .0005 TIR, according to the maker.

Skinner's new hand-indexing power chuck is designed for items that require multi-surface grinding without releasing. The jaws can be indexed under full pressure without touching the work.

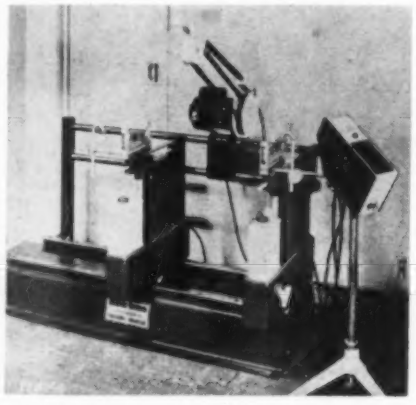
A 12-jaw Horton pinch-type chuck is a major item in the exhibit. It is made in sizes from 18" to 66" in diameter. An adjustable slip clutch permits rapid repeat chucking without danger of distortion due to excessive centering pressure. Accuracy of centering is claimed to be within .001 TIR.

The Skinner Chuck Company, 95 Edgewood Avenue, New Britain, Conn.

Use postpaid card. Circle No. 108

Stewart-Warner Corp. 465

A moderately-priced cradle-type electronic industrial balancer, Model 703, which will enable even small plants and shops to be equipped for balancing requirements in the medium weight and size ranges.



Work range of the Model 703 is as follows: weight—½ lb. to 500 lbs.; diameter—½" to 44"; length—4½" to 55" between bearing surfaces; maximum trunnion capacity—7½" diameter.

Stewart-Warner Corporation, 1826 Diversey Parkway, Chicago 14, Illinois.

Use postpaid card. Circle No. 109

JIG GRINDER

Precise Products Corp. 625

In a compact, high torque electric unit, the new Precise jig grinder will convert any good vertical milling machine into an electric jig grinder, suitable for grinding holes to tolerances of .0001" and surface finishes well within 10 micro inches.

Three basic models will be shown in operation: one with automatic feed; a second with manual feed; and a third without feed mechanism, to mount in jig grinders now using air driven spindles.

(Continued)

OLSON FILTRATION ENGINEERS *Division of The American Laundry Machinery Company, Cincinnati 12, Ohio*

OL-15-G

Send complete information on the new Olson "package" coolant filter.

*Name*_____

*Firm Name*_____

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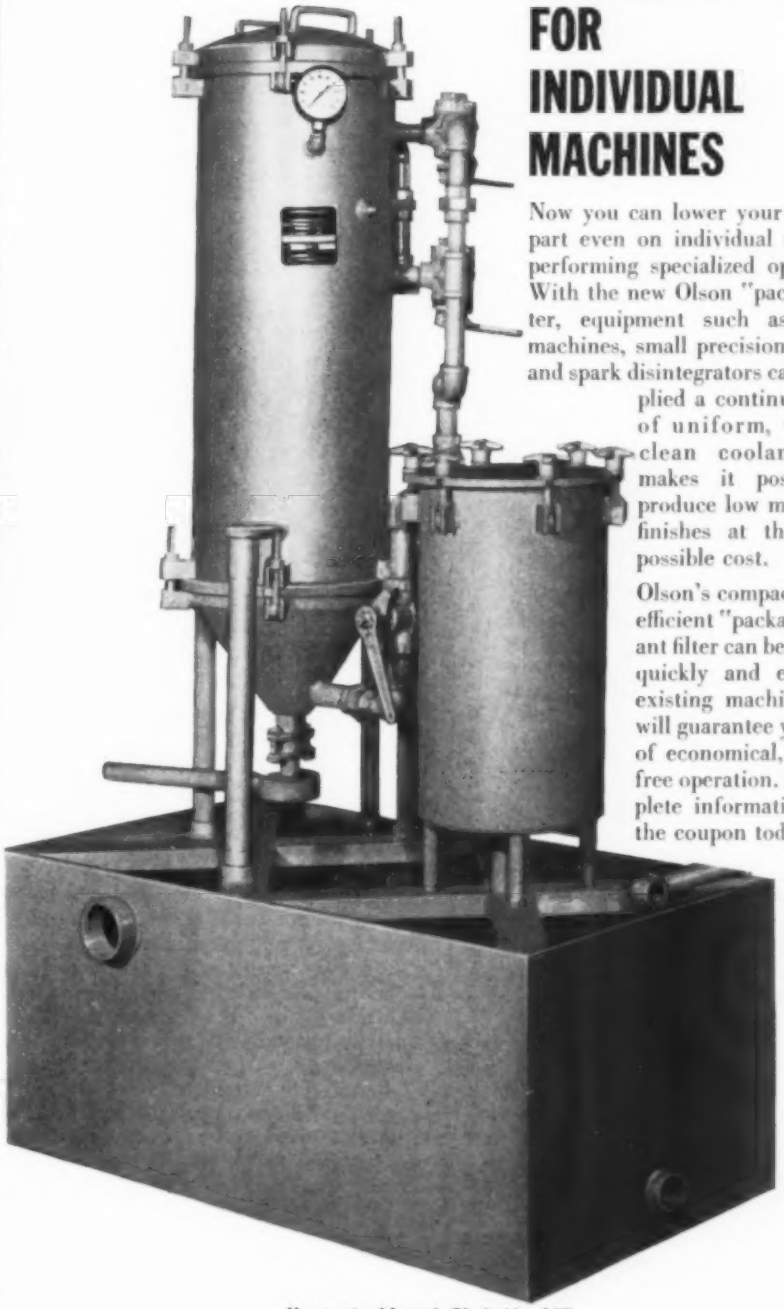
Only from Olson . . .

"PACKAGE" COOLANT FILTERS FOR INDIVIDUAL MACHINES

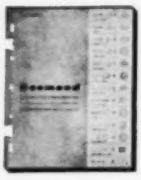


Now you can lower your cost-per-part even on individual machines performing specialized operations. With the new Olson "package" filter, equipment such as honing machines, small precision grinders and spark disintegrators can be supplied a continuous flow of uniform, visually clean coolant. This makes it possible to produce low micro-inch finishes at the lowest possible cost.

Olson's compact, highly efficient "package" coolant filter can be installed quickly and easily on existing machines, and will guarantee you years of economical, trouble-free operation. For complete information, mail the coupon today.

Use postpaid card. Circle No. 267

SEND FOR CATALOG G



NAME

TITLE

COMPANY

STREET

CITY/STATE

DRESS SNAGGING WHEELS:

CUT COSTS

Coarse snagging wheels grind faster, last far longer when dressed regularly with a Desmond Heavy Duty dresser. Even on high-speed resinoid and rubber bonded wheels inexpensive Desmond mechanical dressers expose new, sharp grains and provide a fresh, unloaded surface. Desmond Hex and Huntington dressers are widely used on large and medium size vitrified and silicate wheels. Desmond dressers soon pay for themselves.

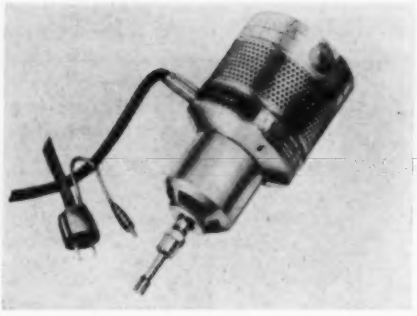
The only complete line of grinding wheel dressers and cutters

Desmond

Desmond-Stephan Mfg. Co.

Urbana, Ohio

Use postpaid card. Circle No. 268



Precise Products Corporation, 3750 Blue River Road, Racine, Wisconsin.

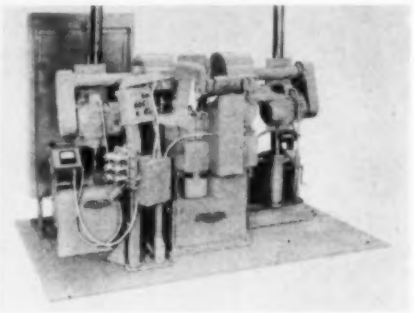
Use postpaid card. Circle No. 110

METAL FINISHING MACHINES

The Osborn Mfg. Co. 375

Metal finishing machinery designed for use with manual, semi-automatic, or completely automatic operations will be the keynote of the exhibit.

As an example of this "Building Block" concept, Osborn will have in operation its 5630-2M1A automatic finishing machine. This machine tool is built for a complete automatic production cycle. Production rates up to 720



pieces per hour can be processed on the machine, using a wide variety of finishing tools such as wire or fiber brushes, abrasive wheels, and buffs.

Also on display will be a new polishing lathe and the latest Osborn developments in power brushes for a wide range of metal finishing applications.

The Osborn Manufacturing Company, 5401 Hamilton Avenue, Cleveland 14, Ohio.

Use postpaid card. Circle No. 111

MOUNTED POINT

National Diamond Laboratory, Inc. 299

A new diamond-impregnated quill or mounted point, in a new bond which is said to permit the diamond grit to cut more freely, will be displayed.

The bonding and manufacturing technique is such as to permit approximately 1½ times the girth of the diamond to protrude from the bond.

According to the manufacturer, the quill will cut hardened steel without smearing. In one test under ideal conditions, forty holes were ground on a jig grinder with .109 diamond quill. Approximately .0025" stock per hole was removed.

National Diamond Laboratory, Inc., 619 South Street, Peekskill, New York.

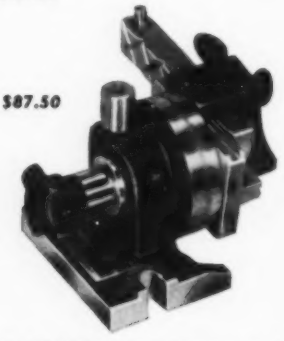
• • •

Use postpaid card. Circle No. 112

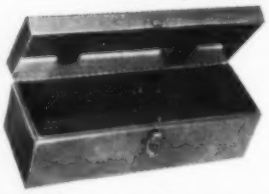
Angle Tangent to Radius WHEEL DRESSING *Simplified* WITH ROTHFUSS TOOLS

THE G-5 RADIUS DRESSER is a precision engineered tool that will dress either a convex or a concave radius from .015" to 1.750" on all wheels up to 10" and it may be set to the exact radii desired. Graduated stops allow you to dress any desired portion of a radius. The spring tension journal insures chatter free operation. *Price $80.50*

Price $87.50



THE G-2 ANGLE DRESSER AND TOOL HOLDER is actually two tools in one, having an easy to read vernier scale 0° to 180° giving accuracy within 2" of 1°; an excellent time saver to set up jobs to be milled, drilled, tapped on any desired angle.



FREE **STORAGE CASE** of light-weight steel, with a hinged top, heavy duty latch and a blocked interior to insure the safety of the dressers when carried.

OUR FIXTURES will dress most radii and angles tangent each other, similar to those shown below.

All for only **$149.50** *(including case and both tools with diamonds)*

Distributorship available in select territories

ROTHFUSS TOOL COMPANY

BOX 2696 ELMWOOD STATION PROVIDENCE 7, R. I.

Use postpaid card. Circle No. 209

whatever your finishing problem

ACME has—or will design—a machine to solve it

Buffing automobile ventwindow frames with Acme machines sets a new production record for one manufacturer—300% more than the previous high! Faster than ever before, and automatically, Acme buffing machines remove "orange peel" and pits, and give the steel frames a flawless high-luster finish for plating. ■ This is the kind of efficiency that cost-conscious companies, large and small, expect from Acme finishing machines. Basic machine designs achieved over 50 years give Acme customers an advantage of selecting one of many equipment arrangements, even for specialized finishing applications. ■ Automotive trim, building hardware, electrical and plumbing fixtures, appliance bodies and trim, primary metal sheets and coils—it's impossible to list here all the mass-produced parts and products now served by Acme machines. Fact is, Acme has—or will build—custom machines to solve deburring, polishing, and buffing problems in all industries, including yours. Call or write for comprehensive catalog today.

ACME MANUFACTURING COMPANY

1400 E. 9 MILE ROAD, DETROIT 20 (FERNDALE), MICHIGAN / LEADING PRODUCERS OF AUTOMATIC POLISHING & BUFFING MACHINES SINCE 1910

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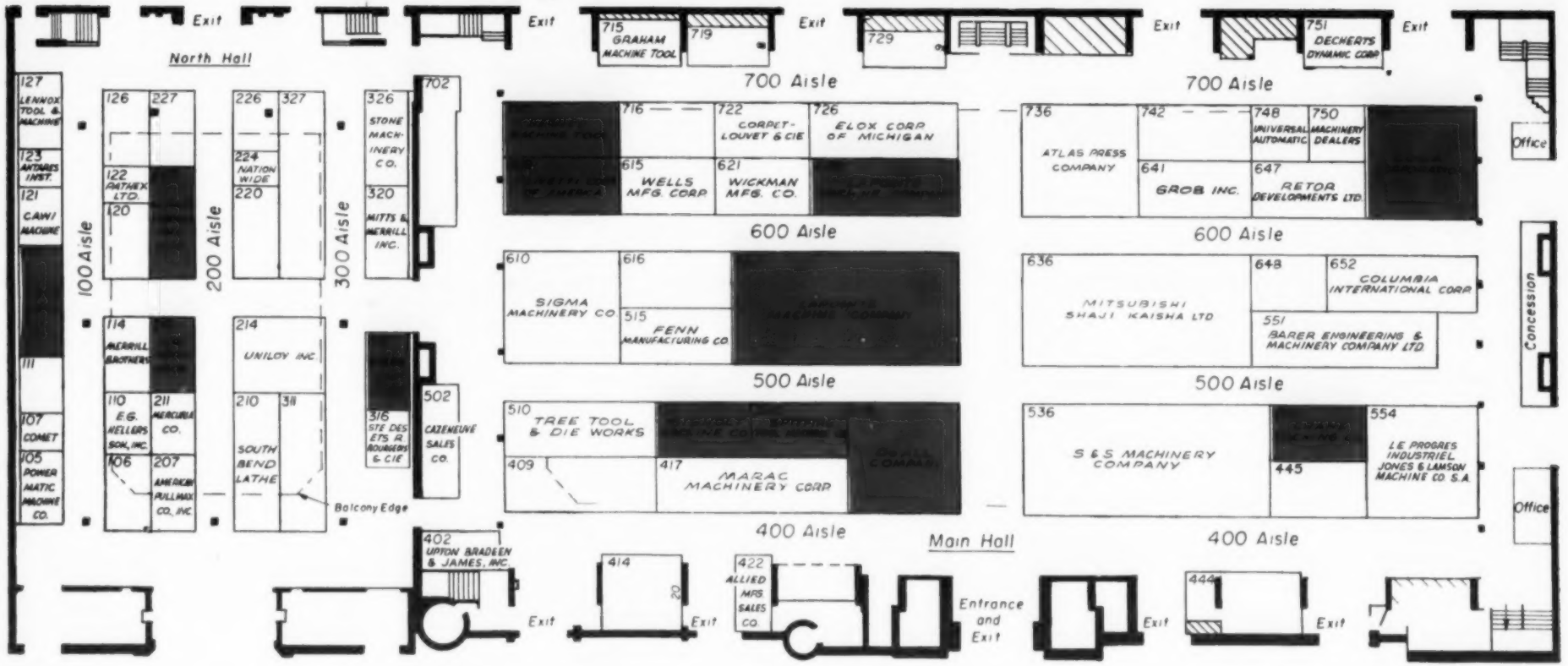
CHICAGO COLISEUM



Coliseum Machinery Show

● The second Coliseum Machinery Show will be held at the Chicago Coliseum from September 7th through the 15th. This exhibit, like the other two shows, promises to be much bigger and better than in 1955. Unlike the other shows, invitations have been sent to approximately 250,000 individuals. If you failed to receive an invitation, registration can be made at the door for $1.00. Badge wearers of the other shows will be honored as guests at the Coliseum.

Exhibits at the Coliseum will represent foreign as well as domestic manufacturers. Both machine tools and accessories will be shown. Automation and other efficiencies achieved through machinery on display will effect economies far in excess of anything envisioned when the same show was held five years ago, according to show management.

Show hours will be from 1 to 10 P.M. daily except Sunday. The Chicago Coliseum is located at 1513 S. Wabash Avenue, Chicago, Illinois. Taxi fare will be about $1.20 plus $.20 per passenger. Time of trip will be about 15 minutes. By private car the Coliseum is fifteen blocks south of Madison Avenue on Wabash Avenue which is one block east of State Street.

How To Use This Issue:

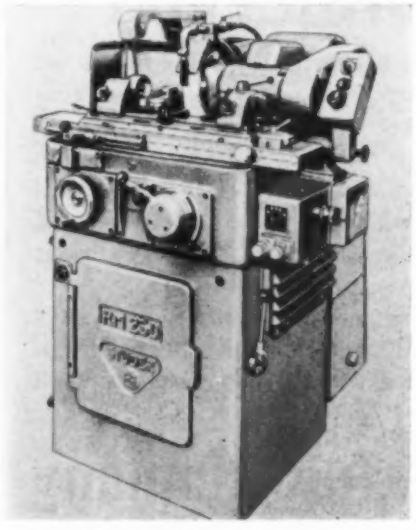
To the left is a map of the booths at the Coliseum Machinery Show. Companies showing grinding and finishing products are listed with product descriptions below. • • •

Product Descriptions

Cosa Corporation 117, 653

In booth 653 Cosa will display a Deckel Jig Grinding and Jig Boring Machine which features simple exchange of heads to convert to either grinding or boring and direct numerical readings clearly indicated in .0001".

Also exhibited will be two Studer Universal and cylindrical Grinders. The RHU 450 will demonstrate match grinding, internal and external grinding, as well as super-fine and lap-grinding to the most exacting requirements for



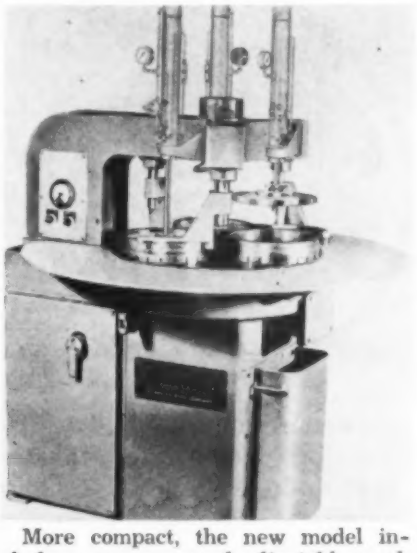
geometrical accuracy and surface finish. The RM 250-L Cylindrical Grinder, shown for the first time in this country, is one-lever controlled with automatic cycling and table traverse.

Cosa Corporation, 405 Lexington Ave., N.Y. 17, N.Y.

Use postpaid card. Circle No. 114

Crane Packing Company 550

The new Model 24 Lapmaster will be displayed and demonstrated by Crane. This machine is a complete redesigned version of the present 24" model.



More compact, the new model includes a wrap-around adjustable work table for rapid loading and unloading. The machine will lap parts of almost any shape, form or material on production basis within one light band and uniform finishes of 2 to 3 rms. A new abrasive distribution system maintains correct mixture of compound to vehicle from initial filling to the last drop. Pneumatic lifts are incorporated as standard equipment to speed up loading and unloading of small and medium parts.

Crane Packing Company, Dept. MB-3, 6400 Oakton St., Morton Grove, Ill.

Use postpaid card. Circle No. 115

The DoAll Co. 528

To demonstrate how to obtain surface perfection DoAll will present two new grinders, a high-production and a manual model. Demonstrators will show how operators can rely on handwheel settings for accurate control of dimension and finish.

DoAll will provide buses for transportation to their "Productivity Show" in the Hall of Progress in suburban Des Plaines.

The DoAll Company, 254 N. Laurel Avenue, Des Plaines, Ill.

Use postpaid card. Circle No. 116

Hermes Machine Tool Co., Inc. 710

Two Blohm Surface grinders will be shown by Hermes. The Model HFS 9 is a hydraulic 12 x 36 machine with a precifilm, oil bearing spindle with hydraulic longitudinal movement of the table. Down feed is in increments of .00004" by push button and cross slide

Anything new in Diamond Wheels?

DIAMOND MANDRELS for precision grinding

You can grind small diameter holes in hardened, heat sensitive steels, carbide, ceramic, ferro-ceramic material, and glass. Shanks are hardened and ground accurately. Diamonds are mounted under controlled atmospheric conditions by a patented new electronic method, assuring their maximum retention. The sharpest edges of the diamonds protrude for rapid stock removal. Widely used on jig and internal precision grinding. Available in a complete range of sizes from .018 inch to .750 inch in diameter.

CUT GRINDING TIME

SEND US SATISFACTION GUARANTEED ORDERS. MAKE US PROVE THESE FACTS!

PRECISION DIAMOND TOOL CO.
P t P.S.M.
ELGIN, ILLINOIS

Use postpaid card. Circle No. 270

movement is .00005". Machines shown will include automatic down feed and automatic sizing control attachments.

The Model Simplex 7 has a capacity of 12 x 28 with a two speed 5½ hp motor built as a single unit with the spindle. The table and cross slide run on ball bearings with rapid traverse for the slide and power elevation to spindle. Table longitudinal movement is hydraulic and the cross slide is electrically controlled.

Hermes Machine Tool Co., Inc., 48-15 Northern Blvd., Long Island City, N.Y.

Use postpaid card. Circle No. 117

Lapointe Machine Co. 622, 625

The Model BW 10 x 36 Lapointe-Churchill cylindrical Grinding Machine will be shown under full power and actually producing parts.

Lapointe Machine Company, Hudson, Massachusetts.

Use postpaid card. Circle No. 118

Speedlap Corporation 312

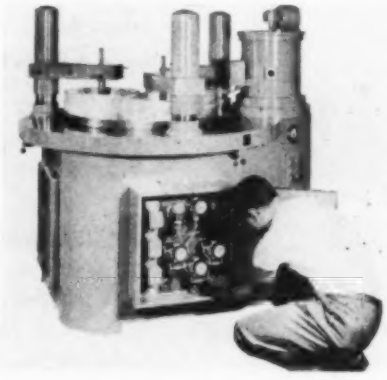
Speedlap will be showing the new Microsize Unit for the first time. The new unit, introduced on June 1st, gives guaranteed repeatability in the lap sizing of germanium or silicon wafers to .005± .0001 with parallelism to .0001. Production rates of 300 silicon or 400 germanium wafers per hour (1" dia.) have been obtained easily in the field with unskilled operators. The unit works in conjunction with a standard 18" Speedlap lapping machine which will also be on display and operating.

Speedlap Corporation, 8022 N. Monticello, Skokie, Illinois.

Use postpaid card. Circle No. 119

Spitfire Tool and Machine Co. 519

By exhibiting the Model 36" Gyro-Matic precision Flat Lapping Machine, Spitfire will display such features as pneumatic lifts which enable operations to by-pass secondary operation, handle irregular shaped parts and lap



various shapes and materials in the same cycle. Other features include an anti-distortion lapping plate of special close-grained cast iron alloy, heat treated, radially grooved and a new dry fluid drive for low starting torque to prevent shock to parts.

Spitfire Tool and Machine Co., 2931 N. Pulaski Rd., Chicago 41, Ill.

Use postpaid card. Circle No. 120

The "Other Side" of CLOVER ABRASIVES

The most important side of coated abrasives is, naturally, *the cutting surface.*

But *the reverse side* can mean more to the user than the superficial appearance of the grit. It carries data on the bond, the weight of the cloth or paper, and the kind of grain. All of this has a great deal to do with the *performance* of the product.

Moreover, the manufacturer's name is a signature. If it says "Clover" on the back, you can be sure it is the best of its kind. Ask for a new Clover Catalog and get acquainted with our full line of abrasive products—*it is good business!*

Clover Manufacturing Company

Norwalk, Connecticut

Victor 7-4515

Quality Abrasives Since 1903

Makers of the famous CLOVER Grinding and Lapping COMPOUNDS

Use postpaid card. Circle No. 246

*Trademark

"No more lugging work half a mile to the inspection room—and hefting it back again when it's a little over tolerance— probably cost the company a fortune for all that lost time too.

This gage you can use right at the machine without taking the work off—and check the surface finish right down to a whisker.

They cost little enough to have one at every machine where we do this kind of work.

Is it good? Just look at the specs!"

- 5 Range selections for any precision roughness measurement: 3, 10, 30, 100 and 300 microinches—full scale.
- Roughness width cut-off available in three ranges: .003, .010 and .030.
- Quickly establishes the requirements for each job and allows faster, closer control of the operation.
- Hand held or motor driven tracer.
- Battery or AC line powered units available.

Contact your nearest Cutler-Hammer office for the name of your authorized distributor.

AIRBORNE INSTRUMENTS LABORATORY
DEER PARK, LONG ISLAND, NEW YORK
A DIVISION OF CUTLER-HAMMER INC.

CONTROL

Use postpaid card. Circle No. 271

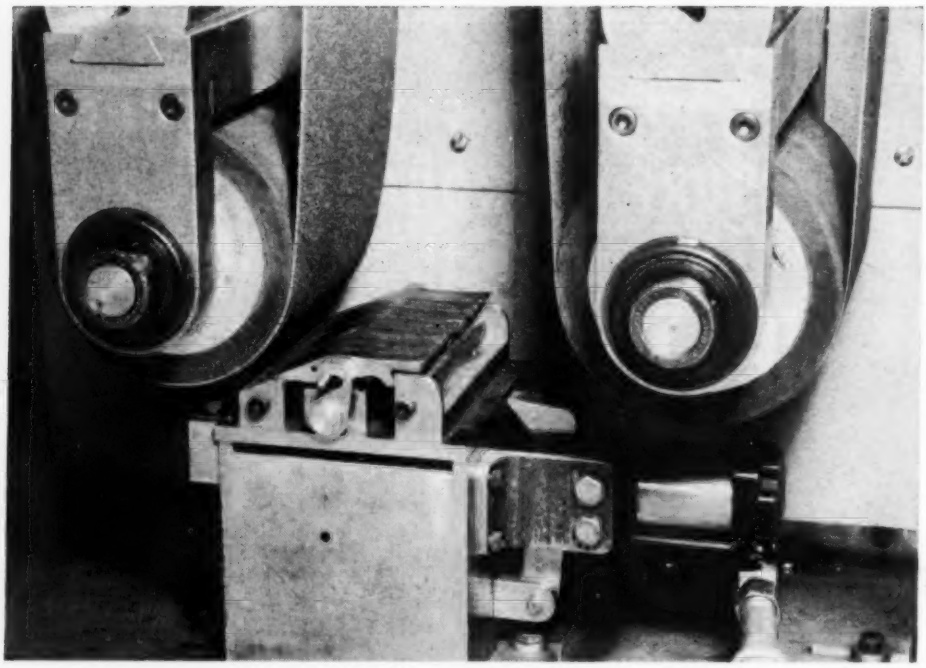


Figure 1. Multiple grinding the form on the top of the jaw of a hand pliers automatically. The top of each jaw was formerly ground by hand, but now 13 jaws are rough and finish ground in one operation.

Do You Want Uniformity and Production?

New rise and fall abrasive belt grinder provides solution to the problem of form and contour grinding of small parts which were formerly ground or finished by hand. The results show greatly increased uniformity and production.

By C. E. WESSON, President
Eastern Machine Screw Corporation

● The grinding of forms or contours on small parts has long been done by hand operators bringing a single piece-part against an abrasive belt or wheel. The low rate of production has been a thorn in the side of many production people for this reason and others. Even with skilled grinders, fatigue and other factors have caused considerable rejects, running in cases as high as 25% at times, to say nothing about the lack of uniformity on parts ground and the uneven wear on abrasive belts due to changing pressures applied by the operators.

But, now, a solution to many of these grinding problems has been found and proven over

numerous production jobs. This solution is with the new Loungway Rise and Fall Abrasive Belt Grinding Machine, which not only enables the metalworking manufacturer to grind flats, forms and contours, but it is possible to do it with ganged parts. Additionally, both rough and finish can be done in one operation, with the use of the double-spindle Loungway Grinder, in a matter of seconds.

The double-spindle grinder provides the greatest opportunity to utilize the rise and fall features of this machine, although a single-spindle grinder is available also. The double-spindle machine generally is set-up to give two rough grind passes and one finish grind pass.

Using Figure 1 as an example, 13 jaws of pliers are held in a jig which is just approaching the left-hand spindle for the first rough grind. In operation, the loaded jig would be attached to the fixture in its stop position to the right of the right-hand spindle. The start button is pushed, the right-hand spindle is automatically raised out of the way so the work pieces pass underneath it in a fast index by the air-operated table. The first index position is to the point just prior to the first rough grind, which is to the right of the left-hand spindle. Then the parts are ground, the table reverses and indexes fast up to spot just to left of left-hand spindle for the second rough grind pass. As soon as this grind is finished, the table again speed indexes up to the point just to the left of the right-hand spindle for the finish grind, after which the table stops for reloading a new jig. The fast indexing feature saves many seconds each cycle.

The rise and fall feature of this belt grinder is obtained by use of a cam follower traveling over a cam that is attached to the work fixture. The cam follower is on the spindle assembly and operates against the cam by gravity, and this pressure is adjustable by the use of a counter-balance assembly. The feature of having the cam attached to each fixture facilitates fast changeover on jobs.

The depth of grind on a work piece is easily checked by using the start and reverse buttons to cause the table to rapidly reverse itself under the belt. The adjustment is easily made from there. For proper pressure of the belt on the work pieces, there is a movable counterbalance which adjusts the gravity pressure from the spindle assembly.

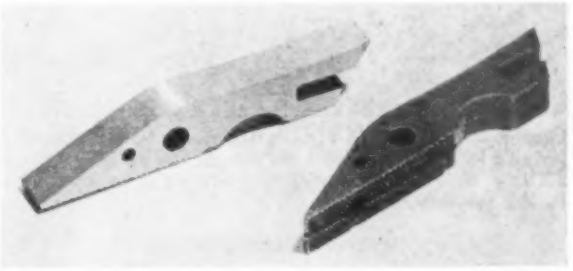


Figure 2. The top form and the sides of this jaw for hand pliers are now machine ground. Part shown in its rough form before grinding then after the top and sides have been finished.

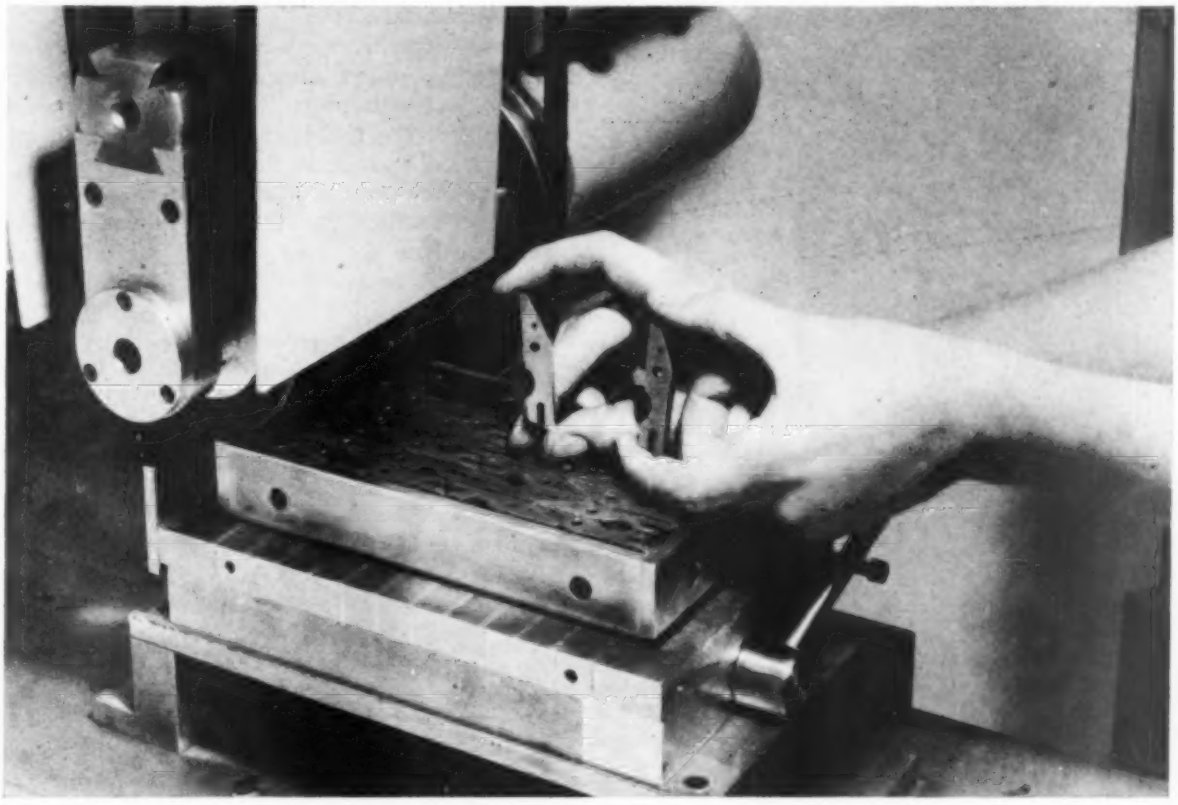


Figure 3. The manufacturer grinding the jaws of pliers uses this single-spindle Loungway Grinder to get the sides of the jaws ground 32 at a time, using a magnetic chuck to hold the jig on the fixture. Two grinding passes are given to these parts in one cycle, and if a finishing pass were needed, a double-spindle grinder would be used.

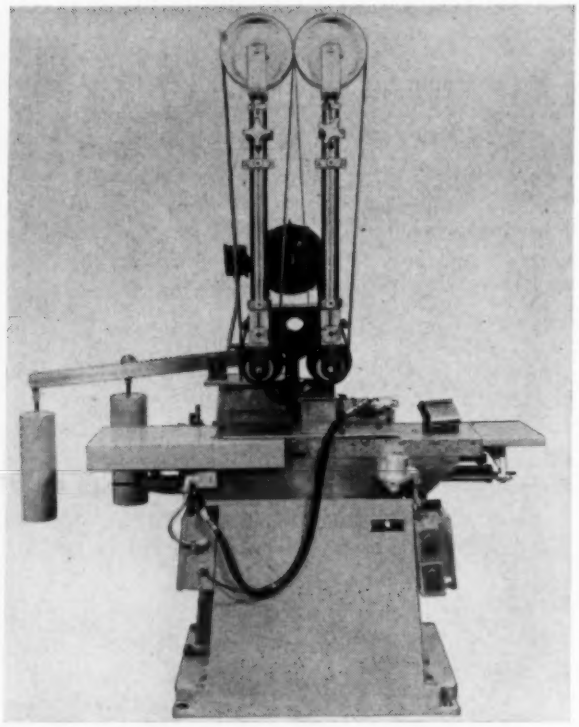


Figure 4. Jack knife blades, formerly had their tops ground by hand, but now are rough and finish ground 28 at a time. A preloaded jig is shown at the right sitting on the table.

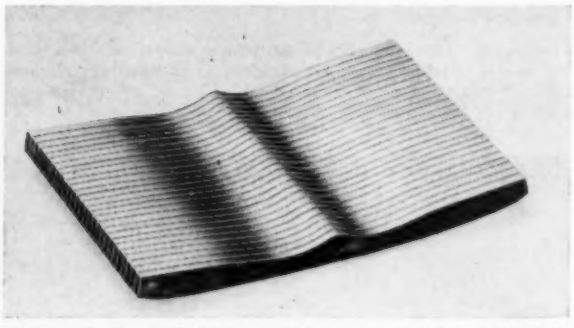


Figure 5. 28 jack knife springs are rough and finish ground at the rate of 2,500 per hour. Hand grinding previously produced 500 pieces per hour.

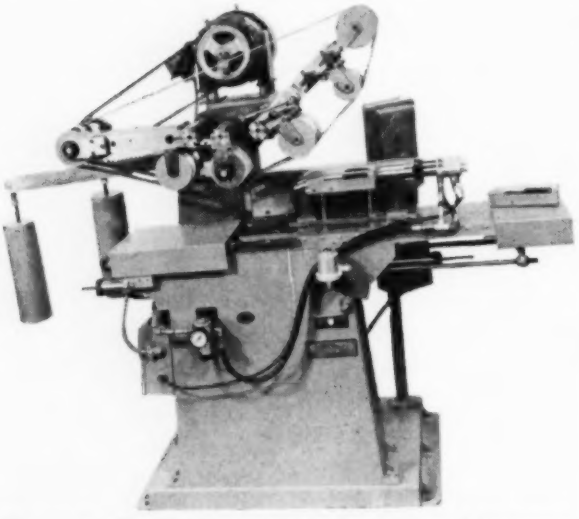


Figure 6. 12 gage shot gun receivers ground by using concave lower spindle wheels to create belt form for the contoured tops. Two ground at a time, and another operation grinds the two sides. This formerly was done by hand.

The counterbalance mechanism can be seen to the left in Figure 4. As also is shown in this picture, solenoids can be used for the chuck on the fixture.

A variation of the double-spindle grinder is shown in Figure 6. This special spindle assembly was designed to grind the form and contour of the top of a 12 gage shot gun receiver. A close look at the lower pulleys shows their concave form, which the abrasive belts assume when grinding pressure is applied. This provides the contour shape for the top, and the cam follower raises the spindle assembly as the work pieces are fed into the grinding operation from right to left on the first pass. Solenoids for chucking jigs are also used in this operation.

Unlimited applications are envisioned for the Loungway Grinder. For instance, two applications have been described in the manufacturing of a jack knife: the top of a blade and the blade spring. Four completely assembled knives have their backs ground and finished in one operation on this grinder, and this was previously also done by hand, with uneven finishes being a problem. Now, nearly every knife is uniformly ground and finished. There are numerous applications in other facets of the hardware field: grinding the lever cap on a hand plane, finishing faces of open end wrenches, grinding the sides of table knives. Others grind and finish parts of jet engine blades and turbine buckets, and another manufacturer uses this grinder in making taps. Wherever hand grinding is now done on small parts because of forms and contours, the Loungway Grinder might change this to automatic grinding—slashing grinding and finishing costs.

Several exclusive features of the Loungway Grinder give added advantages. A special cam attached to the front of the reciprocating table operates switches for speed indexing of table up to the start of each of the three grinding positions, saving seconds each; a floating piston keeps tension on belts uniform at all times; a quick-change feature enables changing belts in seconds; and parts may be hopper fed into grinding position by designing holding fixture and modifying to provide access and ejection of hopper fed parts.

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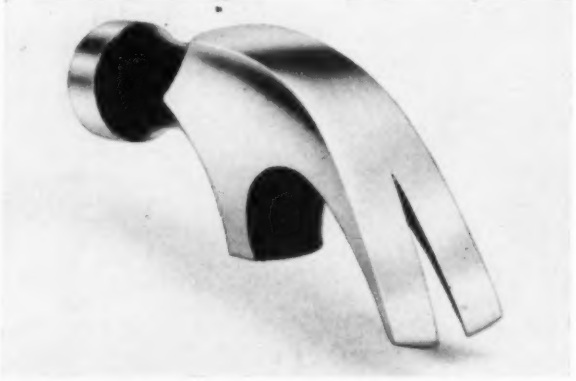


Figure 7. Formerly a hand grinding operation, many surfaces of this hammer head now have uniform, controlled ground surfaces in spite of this product's unusual contours.

Literature

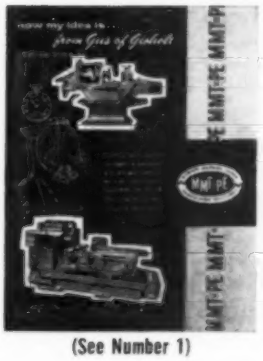
1. Machine Tool Exposition—Background. The history of machine tool shows from Paris, 1889, to Chicago, 1960. Pictures. Sidelights, like the $2.00 a night rooms and $1.00 main dining room dinners at the Palmer House, Columbian Exposition, Chicago, 1893; the Railway Exposition, 1926; and the first NMTBA Exposition in Cleveland, 1927. Gisholt Machine Company, 1245 East Washington Avenue, Madison 10, Wisconsin.

2. Abrasive Belt Grinding Attachment. Catalog sheet illustrates and describes a standard and a heavy duty abrasive belt grinding attachment designed for mounting on heavy duty lathes, planers, mills, or other machine tools where grinding operations are required. The standard model has a 5 hp motor, a 12" diameter contact wheel, and uses belts up to 4" wide. The heavier unit is built for use on lathes with a minimum of 30" swing. Uses 16" diameter contact wheels and a 10 hp motor. Production Machine Company, Wells Street, Greenfield, Massachusetts.

3. Automatic Gear Deburring. Typical applications and complete specifications for the Redin Model 20 gear deburring machine are contained in a four-page folder. It is claimed that gear deburring with the Model 20 is a matter of seconds, entirely automatic except for loading and unloading. The applications shown cover a number of different gears and splines. Redin Production Machine Company, 2433 Twentieth Street, Rockford, Illinois.

4. Wheel Dresser Catalog. A new catalog including the L. Newman tangential angle wheel dressers is just off the press. It includes surface grinder dressers, light and heavy duty hand type dressers, standard and special rotary type, and a complete range of dressers for tool and cutter grinders and cylindrical grinders. An interesting feature of the new piece is an explanation of the tangential angle and its origin. L. Newman, 1001 24th Street, Oakland 7, California.

5. Media and Compounds for Barrel Finishing. A four-page bulletin contains specifications on all Lorco media and compounds for barrel and vibratory finishing. The material gives details of all preformed and natural media used for barrel and vibratory finishing, and lists all the Lorco compounds for both types of finishing. Various specialty media are also included. Bulletin No. 901. Lord Chemical Corporation, 2068 South Queen Street, York, Pennsylvania.



(See Number 1)

(See Number 4)

6. Cylindrical Grinder. A recent eight-page, three-color illustrated catalog covers the Van Norman 418 cylindrical grinder. Utilizing actual photographs and schematic drawings, the brochure illustrates the versatility of the 418, according to the manufacturer. Seven optional accessories for the 418, which broaden its utility and production, are included, along with detailed specifications and a floor plan drawing. Catalog 418. Van Norman Machine Co., Springfield, Massachusetts.

7. Gear Honing. "Newest Developments in Gear Honing" is the title of a recent four-page, two-color brochure from National Broach & Machine Co. Subject of the piece is the Red Ring Model GHD gear honing machine, with the honing principle also discussed. Specifications are given for automatic and semi-automatic machines. A table lists production data for some present industry gear tooth honing applications. Brochure H-60-6. National Broach & Machine Co., 5600 St. Jean Avenue, Detroit 13, Michigan.

8. Bore Gage and Size Setting Fixture. A new precision bore gage and size setting fixture combination which is said to require no gage blocks, rings, or other "masters" to set, check or gage any hole size within its range of .375" to 2.900". According to the manufacturer, it provides accuracy formerly obtainable only by air or electronic units. Bulletin SSC-B1. Sunnen Service Corporation, c/o Department G-10, 7900 Manchester Ave., St. Louis 17, Missouri.

9. Surface Finish Measurement. Eight-page, two color bulletin issued by Micrometrical Manufacturing Co. illustrates and describes typical uses of the Profilometer, and points out its advantages. Material stresses the benefits to be derived from using the instrument in production, particularly in predicting wheel glazing or dulling and in determining exact results of each of a series of finishing operations. LT14. Micrometrical Manufacturing Co., 345 South Main Street, Ann Arbor, Mich.

(See Number 7)

10. Standard Wheel Markings. The standard reference for bonded abrasive wheel markings, as well as for other bonded products, is the American Standard Markings for Identifying Grinding Wheels and other Bonded Abrasives (ASA B5.17-1958).

To obtain literature use Reader Service cards on page 69. Circle on the card the number which appears at the start of the paragraph describing the literature you request.

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FREE LITERATURE *continued*

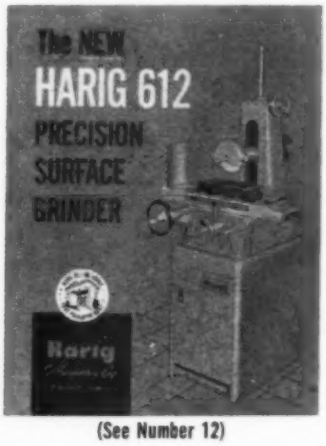
published by The ASME, 29 W. 39th St., New York 18, N.Y. In using this, the most important point is that the alphabetical grade designation is for identification only, and does not indicate grinding action. The Grinding Wheel Institute, 2130 Keith Building, Cleveland 15, Ohio.

11. Tumbling and Burnishing Barrels. The "Reliance" line of tumbling and burnishing barrels is the subject of a 12-page, two-color brochure. Three types are discussed. Various kinds of burnishing and tumbling materials are also included. Chas. F. L'Hommedieu & Sons Co., 4521 Ogden Avenue, Chicago, Ill.

12. Surface Grinder. Colorful new literature on the Harig 612 surface grinder is now available. Fully covered are its automatic forced lubrication system, direct drive spindle and choice of left or right hand longitudinal feed features, all available as standard equipment. Attachments for wet grinding, mist coolant dispensing, and high speed grinding are illustrated, as well as a rotary chuck and a side unit dust collector. Harig Manufacturing Corp., 5751 West Howard Street, Chicago 48, Illinois.

13. Abrasive Belt Swingframe Grinders. Bulletin No. 110 a four-page punched folder shows and explains the G & P heavy duty and extra heavy duty swing frame grinders using abrasive belts. Standard models provide a power range of 3 to 10 hp motors, 5500 or 7500 sfpm, 3", 4", or 6" wide belts 120" or 132" long. Four custom built belt grinders are also illustrated. Bulletin No. 110. Grinding and Polishing Machinery Corporation, 2530 Winthrop Avenue, Indianapolis 5, Indiana.

14. Polishing and Buffing Compounds. A variety of compounds for buffing, polishing, coloring, and related operations are discussed in this brochure. The points to be considered in selecting composition are listed, and the advantages and limitations of the various materials are explained. Chas. F. L'Hommedieu & Sons Co., 4521 Ogden Avenue, Chicago, Illinois



(See Number 12)

15. Sanding Discs and Coated Abrasives. Colorful four page folder punched for standard three-ring binder pictures and describes the "Marvel" line of coated abrasive sanding discs, as well as the flexible cloth abrasive wheels, rolls, belts, sheets and related products. For each

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kind of disc there are notes as to suggested applications, grit sizes, materials to be ground, and similar information. Bates Abrasive Products, Inc., 1129 East 74th Street, Chicago 19, Ill.

16. Disc Grinders. A new 8-page condensed catalog just published by Besly-Welles Corporation illustrates and describes the company's line of high production precision disc grinders. Both horizontal and vertical machines are shown, with dimensions and specifications listed for each model. Featured in the new catalog is the Besly DH 4 double horizontal spindle disc grinder which has the Besly exclusive sealed spindle quill construction. Besly grinders are widely used in the production grinding of coil springs, carbide inserts, ceramic parts and precision components for the automotive, farm equipment, appliance and other mass production industries. Besly-Welles Corporation, South Beloit, Ill.

100. Sam Safety Posters. A single copy of the current Sam Safety poster, or of any one of the ten which have preceded it, 8½" x 11", on 100# enamel, is available on request. Circle No. 100 on the Reader's Service Card. Nos. 1-9 (September, 1959-May, 1960) are available immediately; Nos. 10, 11, 12, and 13. (June-September, 1960) will be available about September 20.

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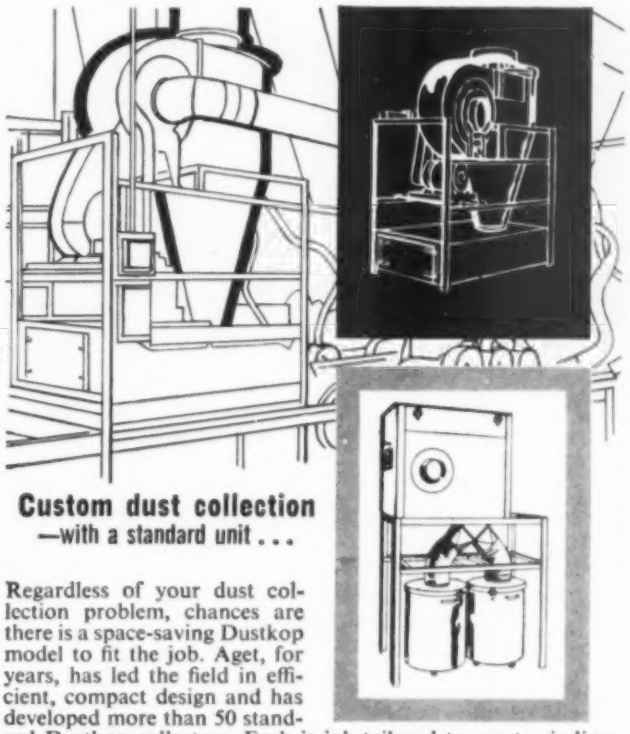

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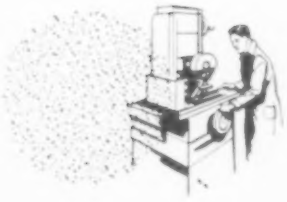

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A recently-announced Hill Acme abrasive belt grinder is claimed to be the world's largest.

Designed to process 54" wide stainless steel strip, two Hill 2-Roll Vertical abrasive belt grinding heads are used —one in the normal position and the other inverted—for one machine. Each head is driven by a 125 hp motor and uses a 56" wide abrasive belt. Over-all height of the machine is 13 feet; however, 36" are below floor level to reduce the height of the pass line.

Vertically adjustable grinding heads are hydraulically operated to accommodate various thicknesses of material and to vary the pressure of the abrasive belt during grinding.

Automatic tension on the abrasive belt with continuous take-up for stretch is provided. Rubber covered guide rolls on either side of the machine aid in guiding the strip and provide proper tension to help flatten the work by "breaking" it over the pressure rolls. This "breaking" action insures full width effectiveness of the abrasive belt.

Hill Acme Company, 1201 W. 65th St., Cleveland 2, Ohio.

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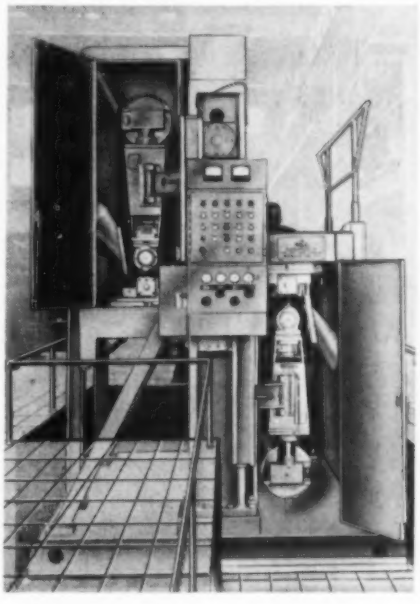
Compact Filtration Unit Needs Only 12 Sq. Ft. of Floor Space

A compact new "package" Precoat Coolant Filter that requires only 3' x 4' floor space is announced by Olson Filtration Engineers, Div. of The American Laundry Machinery Co. For use with honing machines, precision grinders and spark disintegrators, the new filter is ideal for both large and small machine applications.

The new filter gives coolant cleanliness beyond visibility, even to the extent of crystal clarity. Operation is easy, back flushing takes but a few minutes, and the complete filter cycle takes less than five minutes. Simplicity, few moving parts, and sturdy construction keynote the design of the entire



"package" filter unit.

Olson-clean coolant, according to the manufacturer, makes possible savings up to 35% through longer wheel or tool life, longer coolant life, and lower maintenance costs. It also helps prevent surface scratches that can cause parts rejects, and permits more uniform finishes. Users have greater control over quality since one of the quality variables is completely eliminated from machining operations.

Olson Filtration Engineers, Div. of The American Laundry Machinery Co., Cincinnati 12, Ohio.

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New Vibratory Finishing Machine Completes Year of Tests

A new vibratory finishing machine, the Ultramatic Equipment Company's Ferra-Burr, has recently completed extended field tests. A commercial model of 12 cu. ft. capacity has been operating for over a year on a routine production basis.

According to the manufacturer, the machine has produced superior results on small motor housings that formerly required hand finishing.

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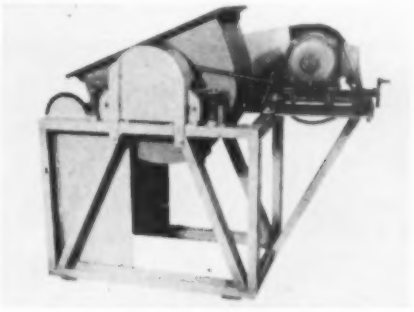
Finishing media surround the parts at all times, and the flow pattern of the media induces pressure on the parts to produce a superior luster without deformation.



The Ultramatic Equipment Company, 1948 North Cicero Avenue, Chicago 39, Illinois.

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Users report fine finish, increased production and tool life, with resulting savings. Metalloid WOS contains no sulphur, is non-toxic and non-corrosive, according to the manufacturer.

Metalloid Corporation, Huntington, Indiana.

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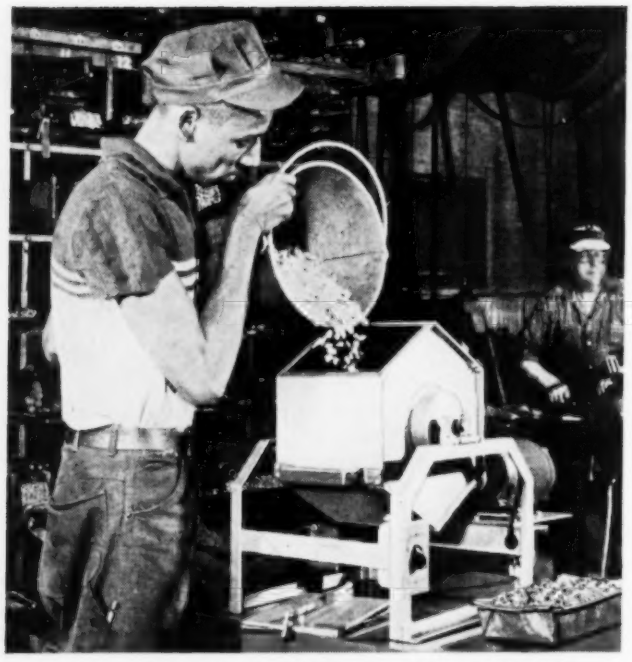

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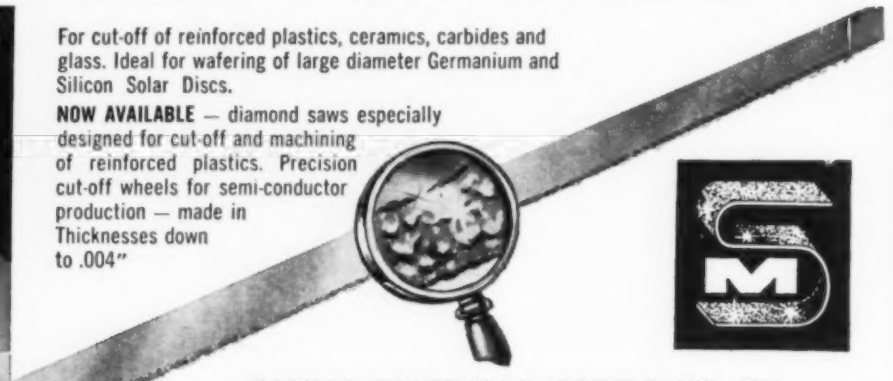

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Schaffner Manufacturing Company, Inc., Schaffner Center, Pittsburgh 2, Pa.

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An adapter for the Surfindicator is used to measure the surface roughness of the bottom of holes, slots, counterbores and any other areas below surface level.

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Removal of the motor drive tang from the adapter permits measurement of bottoms of holes with 3" ID to a maximum depth of 2".

Brush Instruments, Division of Clevite Corporation, 37th and Perkins, Cleveland 14, Ohio.

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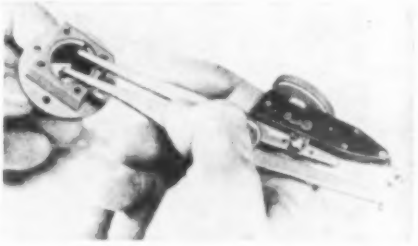
A simple holder to which any "Last Word" type indicator can be attached makes possible the measuring of a wide range of bores, "0" ring grooves, thread reliefs, and undercuts with one low cost tool.



Available from stock, the unit is made of steel, rustproofed, with a satin-chrome finish. Its capacity is from 0.200" to 6.000". Its price complete with case and extension points is $24.00.

Montgomery & Co., Inc., 401 Morris Avenue, Springfield, New Jersey.

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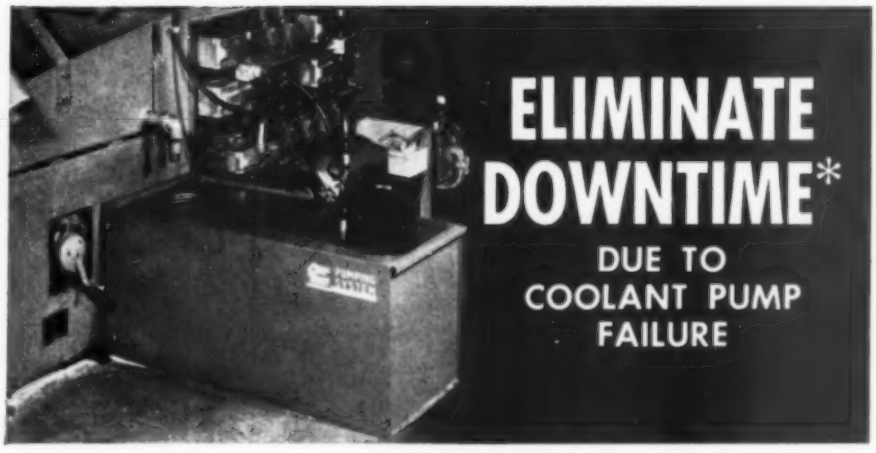

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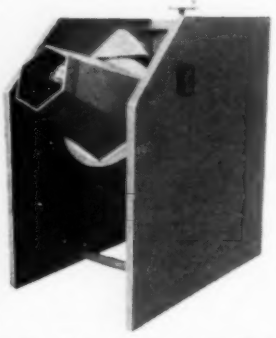

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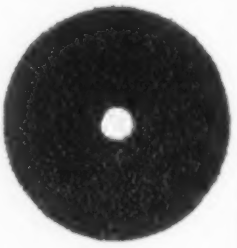

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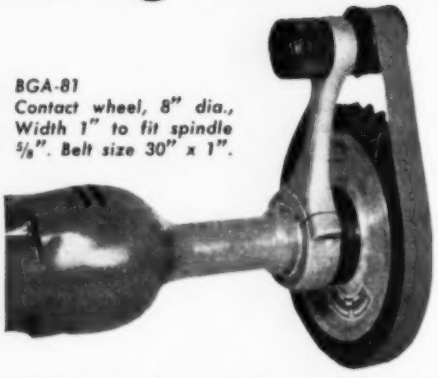

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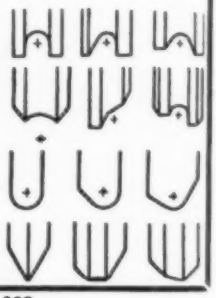

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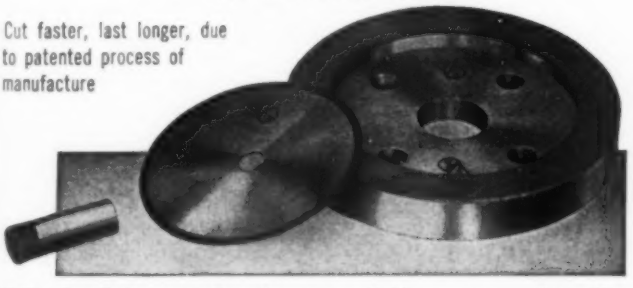

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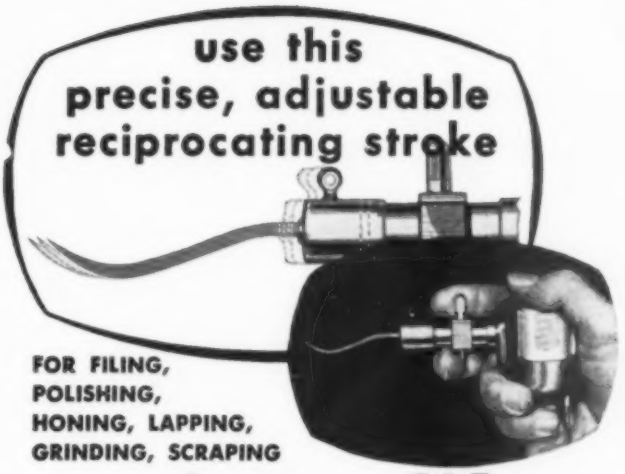

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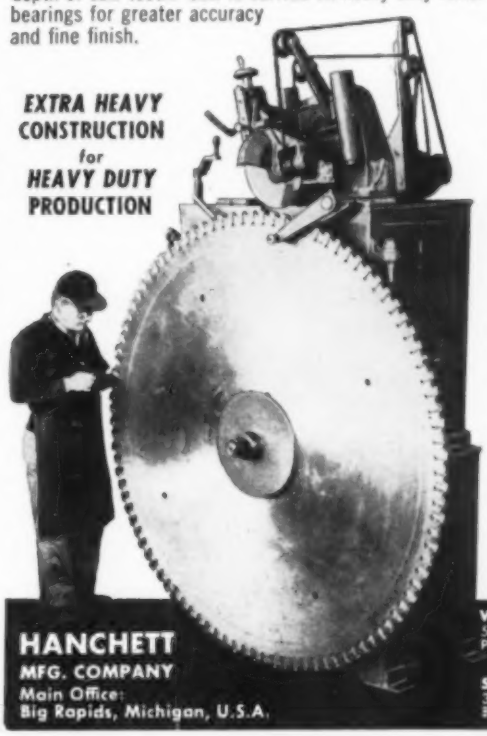

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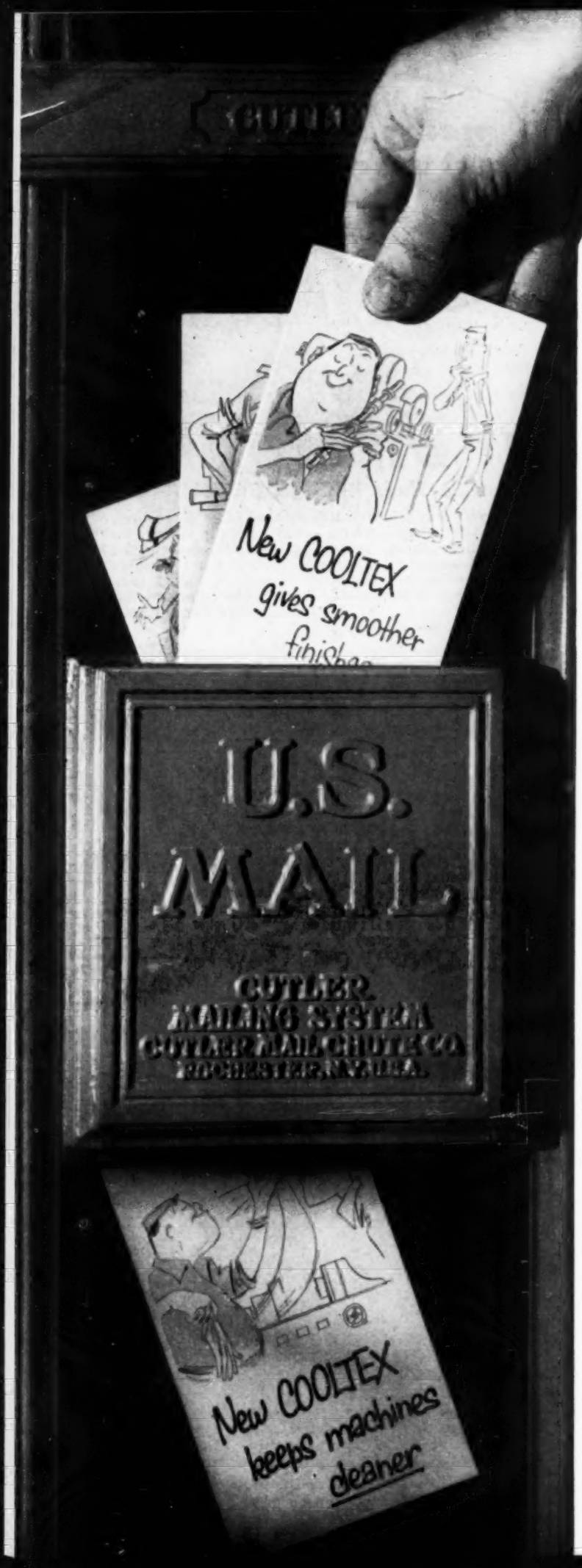

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GRINDING and FINISHING

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New type of abrasive belt grinder provides solutions to the problems of form and contour grinding of small parts.

Coming Next Month

SKF Doubles Production and Cuts Costs with Wheel Design Change

A change in wheel design has resulted in an increase in production of 127%, wheel wear reduction of 50% and a stock removal increase of 310%.

Next to Diamonds in Hardness—How Do You Grind It?

Boron carbide is extremely hard. For this reason grind of this material requires additional effort. This article covers suggestions of procedures for various types of grind operations.

Should You Use Manually Stroked Honing?

Each method of machining has its area of most beneficial application. This article describes the advantages of hand or manually stroked honing.

Relief of Residual Grinding Stresses

The Grinding Wheel Institute has conducted a great deal of research. This article covers the results of one phase of this research.

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It is a nationwide effort on the part of Baird to establish a limited number of strategically located key sources for its barrel finishing equipment. These key sources are independent distributors carefully selected and both appropriately staffed and stocked to fill all possible customer needs . . . from problem-solving test processing of samples to machine service.

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Take Production Away from Labor

PRODUCTION, production, production, was the cry a few years ago, and as long as people manufacture products for a profit this cry will always echo down the aisles and the length and breadth of the bays. However, another monster is gaping for attention: the exorbitant cost of labor in relation to poor individual man/hour output. As long as the demand for production was countered with a commensurate wage, return control over both production and cost could be determined. From an economic standpoint, as well as from that of sound management, wages must be based on productivity. This is fundamental. It is a law of nature: a just return in relation to effort.

Now we are in the midst of a changing philosophy. No longer does a worker expect to be paid in relation to his output, he expects, and does, receive payment on the basis of industry-wide precedence, which in turn is based on such general economic factors as general economic conditions, cost of living, profits and sales. Thus, a small shop in New Jersey, just getting by, may be faced with wage demands based on an industry precedence set in Detroit or Pittsburgh or Akron. Local wages, based on merits—or productivity, if you will—are slowly disappearing. There is a general equalizing of high wages and low production; a general equalizing of the superior, the mediocre, and the inferior worker.

No plant, no industry, no economy is safe from this creeping strangulation.

As with all problems, there is an answer to this one; as a matter of fact, there are several. The one we are concerned with today is that one propounded by industry itself and which may be found in Chicago in September: Take away from labor the control over production.

We have seen giant-like progress in this direction: special machines with but one operator who is more of a watchdog than a machinist; tape controlled machines with a secretary at a keyboard and a watchdog at the machine. We have but scratched the surface of tape, or similarly controlled, machine tools.

In standard tools the shift is in the same direction: pre-selection; automatic shifts; automatic clutches; in fact, any automatic device which will eliminate human control over the production cycle has been designed into many machines to be displayed at the show. To be sure, much remains to be done; but in comparison

to the standard machines of only eight years ago, the progress is encouraging.

If we approach our cost/production problem with the idea of eliminating labor entirely we are doomed to wretched failure. We do not think industry believes it either possible or wise to do so, although some visionaries exploit the elimination-of-labor view with vehemence, if poor logic. However, if we can control production independently of labor something might be gained. And yet, you know, there are a lot of flaws here also.

At any rate, come to Chicago and look around. When you're at the Amphitheatre stop in booth number 1506 (Hitchcock Publishing Company) and say hello.

Wm. F. Schleicher

Vice President & Editorial Director

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...to millionths of an inch

Accuracy that's a must for tool rooms . . . so fine it can be measured only by a light bounce, so precise it produces micro-inch finishes at production speeds. This is the accuracy you get in the No. 560 Grand Rapids Precision Tool Room Type Hydraulic Feed Surface Grinder . . . accuracy assured by such features as hand-scraped V-shaped ways, rigid one-piece column and base casting, truly automatic cross feed and extra-heavy spindle. Why settle for less?

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GALLMEYER & LIVINGSTON

Booth 751, The Machine Tool Exposition

MMT-PE

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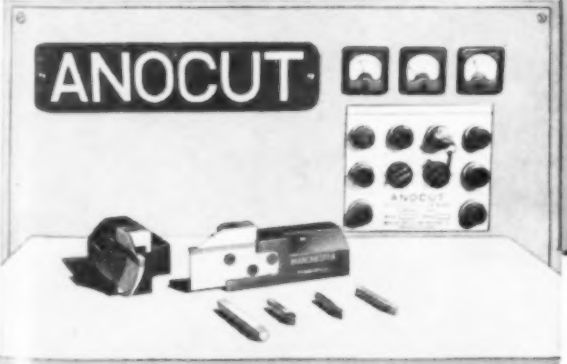
OPERATOR SHOWN GRINDING FRONT ANGLES ON MANCHESTER CARBIDE-TIPPED INSERTS WITH ANOCUT-HAMMOND ELECTROLYTIC GRINDER IS RAYMOND E. NOVKOV, JR.



THIS PHOTOGRAPH SHOWS MANCHESTER MACHINE & TOOL COMPANY FACE GROOVING HOLDER AND CUTOFF HOLDER, BOTH USING CARBIDE TIPPED INSERTS. IN THE FOREGROUND ARE SOME OF MANY STANDARD AND SPECIAL CARBIDE INSERTS, ALL OF WHICH ARE PROCESSED USING ANOCUT ELECTROLYTIC GRINDING EQUIPMENT.

MIDLAKE 4-2245 MIDLAKE 4-2245

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MANUFACTURERS OF THE
Manchester Cut-off & Grooving Tools
SPECIALIZING IN PRECISION PRODUCTION
5142 MANCHESTER ROAD
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MILLING CUTTERS SPECIAL TOOLS

May 25, 1960

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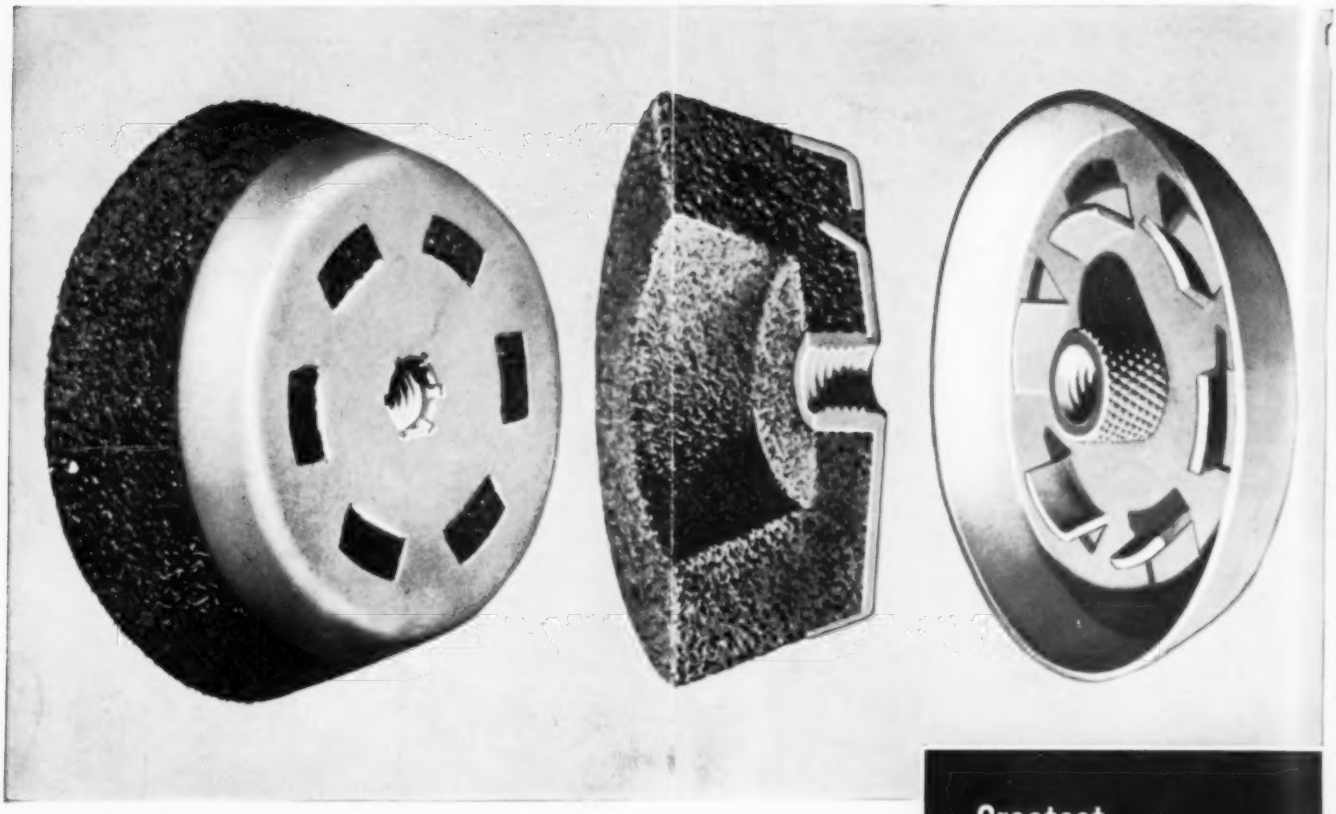

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